





THE CANADIAN FIELD-NATURALIST



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THE CANADIAN FIELD-NATURALIST

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THE CANADIAN FIELD-NATURALIST

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FALL MIGRANTS.

By L. McL. TERRILL, ST. LAMBERT, QUE.

(Read before the Province of Quebec Society for the Protection of Birds.)

An airman recently expressed the belief that the increasing interest in air navigation would eventually tend to induce a seasonal movement on the part of the human race. Even now many wealthy people spend the winter in Florida and California. In the days of the stage-coach, less than a century ago, this was unthought of. At that time a journey to the nearest town, even to one's nearest neighbor, was often an event. Only with the harnessing of steam and electricity was the Californian or Floridan trip possible to the northerner. Who can say what the mastery of the air will produce within another century.

Such thoughts should stimulate us in the study of bird movements—the migrations of these pastmasters in aeronautics. However, anyone who has become well launched in this study needs no such stimulant. Each recurring season he is refreshed by the return of familiar birds and thrilled with a glimpse of others that journey on to a more northern home. In the fall the southward journey completes the two movements known as bird migration—or rather I should reverse the order—the spring movement is the return home. Should it happen that certain birds, moving south in the fall, were to remain there, they would be emigrants from our point of view and immigrants from the southerner's viewpoint. Migration entails a return journey.

In this latitude the spring migration may be said to commence in February and finish in June; while the fall migration commences in July and extends into the winter, making an almost continuous movement of one sort or another, throughout the year, with the exception of three or four weeks during June and July, which marks the height of the nesting season in the north. Thus the fall migration covers late summer, autumn, and early winter, and the term is one of convenience as it marks the height of the movement.

To the novice, who has watched the return of birds in the spring for the first time, there is a vast difference in watching their fall departure. If you consider merely the facility in naming birds as they

pass and re-pass, the spring time is the most favorable for observation. In the first place, after our long winter we are eagerly awaiting the birds that we associate with warmer weather, and so most northerners are to some extent familiar with the appearance of our common birds in spring, although it is often the song that is welcomed—if it were not for the song many birds might escape notice. When recording the return of our summer resident birds one has these advantages. The bird is in full plumage (with rare exceptions) limited at most to two phases (male and female); it is generally in song, and one is more keenly on the lookout for it. Familiarity with the bird throughout the summer begets carelessness about its departure and the last birds are apt to slip away unnoticed. On the other hand those that merely pass through this district to nest farther north are often in a hurry—they may linger in the states to the south, but when this latitude is reached they appear to have an important appointment elsewhere and we miss seeing many of them.

In the fall these northerners are more leisurely; the call to move south is seldom so insistent and we have more opportunity to watch them. Again, they keep more in the open—one sees birds of the deep woods right at his door-step. Many times before starting on an all-day walk I have taken a preliminary survey in my garden, and have seen there the rarest birds of the day.

The feature that makes fall study at once a delight and a torment is the many different plumages often found in one species. Thus we may see juvenile birds changing into first fall plumage, those of an earlier brood that have already assumed fall dress, and adult birds in various stages of moult, all in the same flock. If, as is often the case, you are watching a mixed flock of birds that contains species with close resemblances and all in constant motion, confusion may reign.

In regard to classifying birds the disadvantages in studying fall migration are chiefly, comparative absence of song and greater variation of plumage;

while the advantages are a greater tendency on the part of many forest birds to come into the open, and to linger in orchards and gardens, even in the heart of the city.

This fact gives us at least one distinct and much needed advantage. During the height of the spring migration (April and May) there is a plentiful supply of water in the shape of surface pools and running streams, and the weather is cool. During the corresponding period of the fall migration (August and September) the country is much drier; few surface pools are found and the average temperature is higher.

I well remember one late summer's day, several years ago, passing through a small wood and hearing the call of some chickadees. As the chickadees were moving in my direction I awaited them to see what their travelling companions might be. Nature lovers generally are well aware of the chickadee's sociable nature during migration. Very soon I heard faint *tsips* and *tseeps*, and saw the vanguard of a flock of warblers and other birds. Instead of flitting past in the tree tops, they dropped to the ground about twenty-five feet away in a small glade where I joined them and found the ground about a small water hole literally covered with birds, all pressing forward for a drink and a bath. Others kept continually dropping to the ground and I soon counted a dozen species with scarcely any trouble, a contract that might have taken hours of observation under ordinary circumstances.

I found that this was the only supply of water in the vicinity and I was so impressed with the advantage of being enabled to view the birds from all angles at close range that I went home, resolved to build a bath in my garden. I merely dug out a shallow basin beneath a spruce tree a few feet from the dining-room window, and lined it with concrete. Since then I have been enabled to watch birds and dine at the same time. I must admit that it is sometimes a source of uneasiness to members of my family, although latterly some of them have become so interested in watching, for instance, a robin holding the bath against all comers, that they, too, have forgotten the more immediate purpose of the dining-room.

The study of migration is very exacting—pleasurably so. If one is keen to identify all of the passing birds he is liable to be dubbed a crank. I am constantly making observations from a car window, often to the disgust of my travelling companion, who may be in the midst of an anecdote. One cannot always choose ornithologically inclined company, and further one is loath to lose the psychological moment for an observation that may never occur again. Then there is the desire to give pleasure to

another or rather to share the pleasure of your discovery with another. Some weeks ago (Oct. 6) while half-asleep about midnight, I became suddenly alert at the repeated calls of a screech owl, coming in through my open window. I was so overjoyed that I immediately awakened my brother. On the night of Oct. 14, about the same time, I could scarce believe myself awake when I heard *sch'wet, sch'wet*, from the garden. Actually a saw-whet owl saw-whetting right under my window. On this occasion experienced warned me to restrain my enthusiasm and I listened alone. With regard to the screech owl, it seems to me that it is becoming more common in this district; that there is an apparent movement from south to north. Previously I had seen it occasionally, but this season I found its nest once and heard its notes on three occasions; once at St. Lambert, once at Lacolle, and again near Chambly. I have also heard other reports of its presence in other localities near Montreal. I cannot imagine why it was called screech owl—perhaps the original namer had conjured some terrible apparition after a bad fright and named it after his emotions. To me it sounds a soft, tremulous *whc-c-you-ou-ou*, repeated at short intervals.

When making the bath in the garden I thought, perhaps selfishly, that if my neighbor's gardens had no greater attractions than my own, in the matter of food and protection, my garden would still have to its credit a bird bath and drinking pool, which would attract some of my neighbor's birds. This it has done, and further, it has been the means of prolonging their stay. However, I did not carry my selfishness to an extreme and have since induced some of my neighbors to instal bird baths. As previously stated, the great advantage of the bath is that it brings the birds to the ground and enables you to see distinctly the markings of the upper plumage—an impossible feat when birds are in the top foliage of trees. This is especially true of warblers. Often in the fall when the yellowing leaves are drifting it is even difficult to say which are leaves and which are warblers. Moreover, I can safely say that it would be possible for me to follow the fall migration of most of our small perching birds without leaving the vicinity of the bird bath. I call it a bath instead of drinking pool, because as a bath I count it a greater attraction, as most birds can obtain sufficient water for drinking purposes from the beads of dew found in early morning on leaves and grass blades. As it would take too much space to discuss the fall migration in all of its phases I am going to speak more particularly of these garden visitors that can be observed by anyone who has a yard with vegetation, at a maximum cost of fifty cents and an hour's

labor. Of course you will have the trouble of keeping the bath filled with water, but with a garden hose it is a simple matter.

It has been my custom for several seasons to spend a few moments daily watching this bath. Even five minutes will give surprising results. In comparison with field notes, I find that the collective results give a fairly accurate idea of the birds prevailing at any time, except during very wet or cold weather.

After the middle of July, when vegetation is beginning to lose its bloom, and the cicadas are commencing to sing, I look in my garden for the first signs of migration. There are already arrivals to be seen along the beaches, such as certain shorebirds that start south early in July, but I am going to confine myself to birds that may be found in gardens. At this time you will find the usual concourse of summer resident garden birds at the bath—such as song and chipping sparrows, catbirds, robins, red-eyed vireos, wood peewees, yellow warblers, always the domestic sparrow, and possibly the Baltimore oriole, if it has not already effected its usual mysterious disappearance. Here is a chance for investigation. We know there is a period when the oriole stops singing in the garden, but does it really leave? There seems to be no direct evidence on this point. In the lot adjoining our garden there are some huge elm trees, that might harbor dozens of orioles in the dense foliage of the upper branches. I have caught glimpses of them there, also of wood pewees, catbirds, robins, and vireos, at times when their absence from the garden proper was very apparent. Go to the woods at this time and you will find a corresponding scarcity of birds. Occasionally you will get a glimpse of vireo, flycatcher, or warbler, feeding young in the upper foliage, but where are the many birds one saw earlier in the season? Are they, too, sitting motionless in the tops of the trees? Comparatively few of them have commenced to migrate. A little later when they commence to appear in force in our gardens we know the reason for the deserted woods. Perhaps the fact that there is little to attract us to the woods in late July and August is responsible for our lack of knowledge in regard to the habits of moulting birds. True, there are fewer mosquitoes, but I find the immense numbers of spiders that spin their webs everywhere, even a greater nuisance.

When I note the inactivity of birds during the moulting period, I am reminded of the custom of human beings at Easter. After wearing out their old clothes during the winter there is a blaze of color and activity on Easter morning. However, we cannot draw parallels between the habits of birds and human beings. There is probably a more

vital reason for the retiring habits of birds during the moulting season. For one thing their loosening feathers and ragged plumage may induce a distaste for flight. They may feel handicapped in the struggle with their enemies and so remain in seclusion until new feathers have replaced the old. Whatever the reason for the oriole's disappearance we know that for about two weeks during the latter part of July they do not sing in our gardens. I usually hear them again at the end of July or beginning of August.

We have, in St. Lambert, a flock of bronzed grackles that nest in the neighborhood and often visit the garden. I have come to the conclusion that the grackle does considerable damage in gardens, although I have never had the heart to disturb them. For instance, my corn suffered. A year ago I planted it in shallow drills and the blackbirds promptly ate it. This year I planted it so deeply that it rotted in the wet soil. Later, they turned their attention to the peas and ripped open some of the pods. However, I am repaid to some extent by their increasing tameness. They are not greatly addicted to bathing—they merely splash noisily through the water in their course over the lawn. Once my sister called attention to a new bird in the bath. It was merely another grackle, a high plumage male, with an exceptional sheen of bronze and bluish-green on its head and back, in great contrast to some sober colored females nearby.

One of the first signs of a bird movement is the appearance of an occasional downy woodpecker in the garden. I have never seen this bird enter the bath, but have seen individuals clinging to a spruce tree near it and evidently thoroughly enjoying a shower from the garden hose. When in a hurry to discover what birds are in the garden I sometimes arrange the hose so that a fine spray falls over the bath and spruce tree. This quickly attracts most birds and it is much enjoyed by otherwise diffident bathers. I have frequently watched that model of industry, the downy woodpecker, as it examined the spruce tree for larvae, suddenly stop as it reached the arc of the spray, fluff out its feathers and settle down for a bath.

The birds that I usually see next are the redstarts in various plumages—family parties that have nested in the vicinity (they never nest in the garden). The redstart, like most of the warblers, is a great bather. It usually appears between August 5 and 16, and is closely followed by black and white and chestnut-sided warblers. Most of these early comers are still in family parties. The black and white warbler is especially fond of a good bath. I have seen one, with a mixed lot of warblers, settle down in the shallow water and remain for several minutes after

the others had sought a perch to sun and preen themselves.

Last year (1918) the myrtle warbler was the first migrant warbler seen in the garden, arriving on July 31. In 1919 they were first noted on August 10, which is nearer the average time. I can usually find a few in the garden on any day after their arrival until late in October. Occasionally a few remain after the first of November. This bird is the first migrant to come from a distance (referring only to garden visitors). Their nearest nesting haunt that I know of is in the Laurentian hills.

The water-thrush is one of the earliest birds to come, as is also the Canadian warbler. I never see many of the latter, but the water-thrush is a regular visitor. As is well known it is one of our thrush-like warblers, resembling the ovenbird, but lacking the orange crown-patch. It can always be distinguished from the ovenbird by its sew-saw walk, very similar to that of the spotted sandpiper. I seldom see the ovenbird in the garden; it is one of the few of the smaller birds that keeps almost entirely to the woods, but the water-thrush delights in inspecting moist lawns. It is not a great bather, but loves the vicinity of the bath. Even though indoors I usually know of his presence—his loud *clink* or *cleenk* has a very penetrating quality, and I generally come out to watch this daintily marked “tip-up” as he zig-zags down a spruce limb and inspects the wet lawn before taking a light bath. In its summer home the water-thrush lives in the shadows—in the cool wet woods—and in the garden, too, it is more active during the twilight of early morning and late afternoon, and is generally the last to bathe. The sew-saw motion of the water-thrush, and certain other birds, has always excited my curiosity.

The semipalmated sandpiper, almost wholly a bird of the beach (during migration), follows the shore line by little runs and never bobs its body. Continual necessity for rapid action in avoiding the incoming waves may be responsible for this mode of advance. This small sandpiper keeps to the shore level and avoids boulders and other obstacles in its path. On the other hand the spotted and solitary sandpiper and the pipit, when feeding on the beach, generally examine the tops and boulders. It seems probable that similarity in feeding habits is responsible for the bobbing motion common to these three birds. Did the water-thrush acquire its similar motion in a like manner and has it only recently left a water habitat for the woods? Watch a spotted or solitary sandpiper as it flies from stone to stone in the bed of some swift-flowing brook, balances a moment on the polished slippery surface, and creeps to the edge in its search for food

amongst the clinging mosses, and you will readily perceive one reason by which the “tip-up” may have acquired its motion. Even a sandpiper may not relish an unpremeditated ducking. The balancing of the spotted sandpiper is the most pronounced, while the solitary bobs spasmodically, as befits a sandpiper that has adopted the habit of rearing its young in trees, although it has not yet learned the art of nest-building.

Often the bay-breasted warbler is amongst the first arrivals. They are always in flocks and by the time they appear the fall moult is almost if not quite complete. It is difficult to reconcile their fall dress with that of the spring. About the only recognition marks to be distinctly seen are the white wing bars and spots on the outer tail feathers and these marks are common to other species. Here is where the value of the bath is felt. If you look closely you can usually make out a little bay color on the sides, sometimes deepening to chestnut, according to the age or sex of the individual. This will serve to distinguish it from the young of the black-poll which often associates with the bay-breasted and which it resembles closely. I have watched these birds carefully during the past few years and have come to the conclusion that the bay-breasted far outnumbered the black-poll, at least in this district during the fall migration. It is a pretty sight to see the bright yellowish-green backs of half-a dozen or more of these birds as they bathe in perfect harmony. The bay-breasted warbler comes early and remains late and is one of the most common fall garden visitors. In 1919 they were noted from August 20 until September 21.

The Cape May, Magnolia, Nashville, and Tennessee warblers follow more or less closely. It seems almost unreal to see a Tennessee warbler composedly bathing a few feet away. It is quite a contrast to watching them in their nesting haunts where they seldom approach closer to you than the tip of some dead bleached limb, fifty feet or more from the ground. Then the male bird's breast feathers were a dazzling white, now they are a dusky yellow or yellowish-white.

On Aug. 10 this year I saw the first white-throated sparrow in the garden, but they did not become common until the second week in September. They were always to be seen from that time until late in October. Most of the sparrows are fond of bathing, but are not as energetic about it as the warblers.

Vireos are much less given to bathing. They are usually content to perch beneath the spray and allow the mist to fall over them. Often they will dive through it and occasionally take a proper dip in the bath. The red-eyed vireo is found in the garden

throughout the summer, sometimes until October. The warbling vireo is less common, while the solitary and Philadelphia are rare visitors. I have only one record for the latter—August 11 (1918). It is a beautiful little bird, much smaller than the red-eyed vireo, and with a great deal of greenish-yellow in its make-up. I watched it glide along the elm twigs until it seemed a part of the foliage and melted from view. The pursuit of its prey—the small hairless caterpillars, lying inactive in the curled-up elm leaves—called for a smooth, unhurried progress. These caterpillars are very attractive to other vireos and especially to the Baltimore oriole.

Flycatchers act much like vireos toward the bath. The wood peewee takes an occasional bath, but more often simply flies from perch to perch, back and forth through the spray. It is loath to remain long away from its beloved perch. Dabbling in a bath gives opportunity neither to flip its tail nor snap up passing insects.

Another speedy bather is the ruby-throated hummingbird. I have never seen it do more than dive through the spray at the usual rapid gait. The ruby-throat is a color specialist. I have not known it to nest in the garden, but it often visits us during August and September—even as late as Sept. 14; it is generally found about flowers of a reddish hue. Sometimes late flowering scarlet runners are its objective; again the orange lily is chosen.

This brings us well into September. The yellow warbler has gone entirely. It disappears suddenly and very regularly about the end of August or during the first few days of September. As we are near the northern limit of this warbler's range in the east, there are few arrivals from the north to take the place of departing local birds.

The Maryland Yellow-throat is liable to visit the shrubbery at any time in September, but that is as far as it gets. I have never seen one bathe. Although August (in the garden) is essentially a warbler month, there are a few of them that I generally fail to see before September—such as the black-throated blue, black-throated green, and yellow palm warblers. They stay here quite late but the myrtle outdoes and outstays them all.

If August is a warbler month, then September might be called a sparrow and thrush month. Besides the robin and bluebird I have seen four of the true thrushes in my garden—Wilson's, olive-backed, gray-checked, and hermit—and all but the gray-checked bathed. The robin and the olive-backed thrush are especially fond of a bath and they bathe very thoroughly. The true thrushes are mild-mannered, but the robin finds the bath all too small to permit of mixed bathing, and generally chases

other birds away. Some of them are discouraged for a time, but not so with the song sparrow. I have often watched this persistent little fellow dodging in and out, looking for an opening, until the larger birds finally vacated the bath.

The robin has a far northern range, which is indicated by repeated influxes during September and October. One may fail to see them for a time and then some morning the lawn will be dotted with them. The lawn is the robin's market-place. I watched an amusing incident one day. A robin had just pulled a worm from its retreat and landed it safely on the ground when another robin darted up and seized it. It was amusing to see the wild chase that followed.

The white-crowned sparrow usually arrives about Sept. 18, and can often be heard singing a low-voiced song. Never a boisterous singer, its fall song is especially subdued. Most of the sparrows are now in the midst of a song revival, but the songs are usually incomplete and faintly uttered; sometimes a mere whisper of the spring song, and at other times quite different from it. As the weather becomes cooler the song often changes in volume and quality until frequently the full spring song is uttered.

Many birds sing but a portion of the mating song. The Tennessee warbler, for instance, gives only about half of its full song, but it can always be recognized by the piercing insistence of the climax note. Little appears to be known as to what proportion of these unfinished songs is the product of mature and immature birds. Much might be learned in regard to subspecific relations from a study of immature birds' songs.

About the time of the white-crown's arrival there is an influx of chipping sparrows from the north, and the purple finch is liable to visit the garden at any time in September. Both of these birds are fond of a bath. Red-breasted nuthatches are seen about Sept. 16, closely followed by the brown creeper, ruby-crowned kinglet, and an occasional winter wren. I have only once seen the winter wren bathe and it scolded all of the time. The creeper is the busiest bird I have ever seen. It is incessantly on the hunt for its daily bread and must consume an immense amount of insect eggs and larvae. Up to the top of one tree and away to the foot of another there is always another tree and never time for a bath. It does not relax even to sing; it is noted for its lack of song. I have heard it but once, curiously enough not in the depths of its woodland home, but in a garden on the main street of St. Lambert, during a drizzling rain—a very sweet song that took me some time to locate, owing to the ventriloquial qual-

ity of the creeper's voice and the bark-like appearance of its plumage.

September finishes with an occasional visit from a yellow-bellied sapsucker or blue jay and the arrival of the first batch of slate-colored juncos. The jays never linger long, merely alight on the tops of the elms and away again. These elms offer an attractive resting place for birds of the open country. Once a sparrow hawk perched there; an occasional crow is seen in early morning, and meadowlarks often sing from the tip-top foliage. Red-winged blackbirds, too, sometimes rest there; once I saw one of them bathe.

About the beginning of October bands of restless golden-crowned kinglets visit the apple and cherry trees, as well as the evergreens, while an occasional white-breasted nuthatch prefers to examine the bark of the elms. A little later the black-capped chickadees come and tell me that migration is rapidly waning. Though there are a few finches and others still in the garden, October is essentially a chickadee-kinglet month.

The chickadees are the gleaners that follow in the wake of the earlier hosts of insect hunters. They are always followers rather than leaders. Their progress must need be slow if they would hunt out all of the tiny stages of insects that the others have overlooked in their haste. I sometimes wonder that there is an insect astute enough to hide its progeny from that army of keenly peering eyes. It seems to me that, not only each tree, but each twig and leaf is examined many, many, times.

The hermit thrush is more commonly seen now. On Oct. 13, 1919, at dawn I saw one taking a bath, or rather, I heard him in a varied repertoire as it was scarcely light enough to see him distinctly. First he gave his usual *chuch*, followed by a whistled *phcu*, and then that nasal *n'yea*, that the Wilson's thrush delights in, and finally he sang in an extremely subdued tone. I had not been making a daily practice of arising at dawn but, heartened by hearing the hermit sing, I tried it again the following morning and saw a bird new to the garden, a fox sparrow, having a royal time all to itself in the bath and splashing noisily. At first I thought it another hermit, but the whirl of the wings as it splashed spelt fox sparrow, and as it grew lighter I saw it distinctly—the first of this species I had seen in the garden.

Towards the end of October, pine siskins, redpolls, and tree sparrows pay brief visits to the garden, and still later possibly grosbeaks and waxwings, but the bathing season is over. It is cold now and the birds do not feel the need of it. The indomitable song sparrow is still here in small numbers, and a few white-throats, juncos, and robins, but the bulk has gone.

November is mainly a chickadee month. What other birds there are have mostly retreated to the shelter of the woods.

A list of the birds observed to actually rest in my garden, save two species, the saw-whet and the screech owl, which were plainly heard but not seen, is given below. Those designated by an asterisk used the bath, while several others were content with the spray. I have made no mention of birds seen passing overhead, such as swallows, swifts, nighthawks, and others. The lot on which these notes were made is situated in the town of St. Lambert (opposite Montreal), a quarter of a mile from the river shore. This lot is about one hundred feet square and contains lawn and garden with apple, cherry, ash, maple, elm, cedar and spruce trees. A favorable feature is a thicket of hawthorn and wild cherry in an adjoining lot.

The list follows: sparrow hawk; screech and saw-whet owl; hairy and downy woodpecker; yellow-bellied sapsucker; flicker; ruby-throated hummingbird; *wood peewee; *least flycatcher; *phoebe; kingbird; crow; blue jay; *bronze grackle; *red-winged blackbird; cowbird; *Baltimore oriole; meadowlark; evening grosbeak; pine grosbeak; redpoll; *purple finch; *goldfinch; *domestic sparrow; *song, *white-throated, *white-crowned, *chipping, *fox, and tree sparrows; *slate-colored junco; *black and white, *black-poll, *bay-breasted, *black-throated blue, *black-throated green, *Cape May, *yellow, *yellow palm, *Tennessee, *Nashville, *chestnut-sided, *myrtle, *magnolia, and Canadian warblers; yellow-throat, *redstart, ovenbird, and *water-thrush; *red-eyed, solitary, Philadelphia, and warbling vireos; *catbird; ruby-crowned, and golden-crowned kinglets; *red-breasted, and white-breasted nuthatches; black-capped chickadee; brown-creeper; house, and *winter wrens; *Wilson's, gray-cheeked, *olive-backed, and *hermit thrushes; *robin; and bluebird.



THE RHOPALOCERA, OR BUTTERFLIES, OF HATLEY,
STANSTEAD COUNTY, QUEBEC, 1919.

By H. MOUSLEY.

In January of 1840 there was published in London a book entitled, "The Canadian Naturalist," written by P. H. Gosse, who afterwards became a Fellow of the Royal Society, and a well known author of works pertaining to invertebrate zoology. Gosse who was born in 1810, came to reside at Compton, a village some seven miles to the north-east of Hatley in 1835, and remained there for about three years. During that time he wrote the above book, which contains probably the first and only general account of the Rhopalocera and Heterocera of this district.

Of the first named I find there are twenty-five species and forms enumerated in the work. Of this number I have to-day verified twenty-three, besides adding another twenty, thus making a total in all of forty-five to the present day, certainly not a very large proportion of the six hundred or more species to be found in North America, north of the Gulf of Mexico and the Rio Grande. Hatley, therefore, cannot be said to be nearly so rich in butterflies as it is in birds, for of the latter I have already recorded one hundred and seventy-five species, or nearly one quarter of all those known to inhabit the United States and Canada. Before proceeding further, however, it may be well to state that my data regarding the butterflies has been gathered casually during the past nine years, whilst pursuing my favorite study of ornithology, and therefore the list does not profess to be final in any way, but may serve as a basis for further systematic work. Of the nine seasons referred to, the present one (1919) has been by far the most prolific, many species such as the Great Spangled and Silver-spot Fritillaries literally swarming, whilst the Yellow-spot and Tawny-edged skippers appeared in myriads, it being almost impossible to walk anywhere without putting them up in clouds. Apparently a similar state of things existed eighty years ago, for Gosse in his "The Canadian Naturalist," 1840, p. 228, says, "Among the clover blossoms, hundreds of little skippers are dancing in their peculiar jerking way from flower to flower. The Yellow-spot (*Pamphila peckius*) is abundant, and another species much resembling it, the Tawny-edged skipper (*Pamphila cernes*)." Other species such as the Red Admiral, Hunter's Butterfly and most of the Graptas (now genus *Polygonia*), were more numerous than usual, the hot, and for the most part humid weather of June and July, no doubt, accounting

for this extra abundance. In seeming contrast to this profusion, however, might be noticed the unusual scarcity of the Black Swallow-tail, as well as the total absence of the Monarch, both of these species being as a rule fairly plentiful.

The country around Hatley is of an undulating character, the village itself standing at an elevation of 1,000 feet above the sea level, with Lake Massawippi, a fine sheet of water, nine miles in length, and about one mile in width, lying on the western side. It is between this lake and the village, that most of my records have been made, and I know of no species on the eastern side of the village, that cannot be found on the western, although a few are somewhat more abundant on the former side.

Of the nine families of butterflies represented in the United States and Canada, namely, Papilionidæ, Pieridæ, Danaidæ, Satyridæ, Nymphalidæ, Libytheidæ, Riodinidæ, Lycaenidæ and Hesperiidæ, all but two have been found at Hatley, the missing families being Libytheidæ and Riodinidæ.

The Nymphalidæ or "Brush-footed Butterflies," the largest of all the families of butterflies, is also the best represented here with twenty species, then follows the Hesperiidæ or "Skippers," with nine, the Lycaenidæ or "Blues," "Coppers," and "Hair-streaks," with six, and the remaining four families with ten representatives. Most of these species are to be found generally distributed and in fair numbers, but there are some that seem to call for special remarks, and I propose to deal with these, in the order in which they appear in the latest check list.

THE BLACK SWALLOW-TAIL, *Papilio polyxenes* Fabr. In view of the general abundance of this species in most seasons, it is interesting to note what Gosse says about it in his "The Canadian Naturalist," 1840, p. 184: "Another species, the Black Swallow-tail (*Papilio asterius*), is likewise found in Newfoundland and the Southern States, in both of which I have found it numerous, and I have seen it mentioned in lists of New England insects, yet I have not met with it in this province. I should suppose, however, that it is a native, but probably, as in Newfoundland, only appears plentifully in particular seasons." Considering that Gosse lived three years at Compton, we can only come to the conclusion, that he could hardly have passed it over, if it had been there in those days, for he records another of the same genus, the Tiger Swallow-tail, as being plentiful.

THE CABBAGE BUTTERFLY, *Pieris rapae* Linn. I never go into my garden and see a host of these butterflies flying about the cabbages, without thinking of the halcyon days that must have existed in Gosse's time, for he does not record this greatest of pests, although he mentions the Grey-veined White. Surely the march of civilization brings a trail of evils in its wake!

THE CLOUDED SULPHUR, *Eurymus philodice* Godt. This is a very common and well distributed species, being more plentiful, however, in some seasons, than in others. It is fond of congregating on moist places, especially on roads, where I have seen as many as fifty gathered together so closely, as to be almost touching one another. There are at least two broods, the first appearing in May, and the second in August, my dates for fresh examples ranging from May 15, to as late as Oct. 27. They vary considerably in size, several of the second brood especially, being merely dwarfs, whilst many of the females are albinos, but I have never come across a melanic form of the male as yet.

THE PEARLY EYE, *Enodia portlandia* Fabr. I only came across this species in 1918, and then only two examples were met with, one on July 31, and the other on Sept. 3. In the following year, conditions were evidently similar, for I only saw four examples between July 12 and 17, so that it is evidently an uncommon species here. In "The Canadian Naturalist," Gosse, 1840, p. 246, there is an illustration of it drawn by the author himself, who speaks of it as a rarity here in those days, although plentiful in the Southern States.

THE CLOUDED WOOD-NYMPH, *Cercyonis alope* form *nephele* Kirby. Probably the present exceptionally humid season, may have been responsible for my finding two male examples of this dimorphic variety of *Cercyonis alope*, showing rather more yellow on the fore wings than is quite typical, in fact a mild compromise between *nephele* and *alope*.

HARRIS' CHECKER-SPOT, *Melitaea harrisi* Scud. Of the smaller crescent-spots this apparently is the rarest, there being only one meadow where I have taken it so far, and even there it seems to be very scarce, only one specimen being seen in 1918, and none during the present prolific season of 1919.

NYCTEIS, *Phyciodes nycteis* Dbl. and Hew. As this little butterfly may be mistaken on the wing for *Melitaea harrisi*, with which it is often found flying, it is not so easy to define its exact status here, but so far as my experience goes, I have found it next to Harris' Checker-spot, to be the rarest of the smaller crescent-spots. I only came across one example in 1917, none in 1918, and only five during the present season.

THE VIOLET TIP, *Polygonia interrogationis* Fabr. Of the genus *Polygonia*, this is certainly the rarest species here, for I have only come across it this season (1919), and then only three examples have been noted, as against large numbers of *P. comma* and *P. progne*.

THE GREEN COMMA, *Polygonia faunus* Edw. Of the four Graptas (now genus *Polygonia*) mentioned by Gosse, this is the only one that I have been unable to verify so far, which seems somewhat strange, in view of the fact that the present season (1919), has been an exceptionally good one for the other members of this interesting genus.

THE COMPTON TORTOISE, *Aglais j-album* Bdv. and Lec. This large and handsome butterfly, although having a wide range, is more or less uncommon everywhere, and its numbers at Hatley of late years, seem to be on the decrease if anything, although in July, 1911, it was quite common on the "meadow road" to the east of the village, which at that time was bordered by willow trees (on which the larvæ feed) most of which, however, have since been cut down. Apparently there are two forms of the underside, one dark and the other light, but probably this difference is only sexual, the males being the brighter colored.

HUNTER'S BUTTERFLY, *Vanessa virginiensis* Dru. Until the year 1918, I had always looked upon this handsome butterfly as being particularly scarce here, but during June, August and September, quite a number of specimens were observed, probably owing to its being a good year for the species, the same as 1911 was for *Aglais j-album*. The hot summer of 1919 seems to have suited it also, for its numbers have been even greater than in the previous year. Gosse does not record it in his work, nor yet the still more showy Red Admiral.

THE PAINTED LADY, *Vanessa cardui* Linn. Apparently this is an uncommon, if not a somewhat rare butterfly here, as I have never come across it until the present year (1919), and then only four examples have been noted, one on Aug. 7, and the other three at the end of September.

THE BANDED PURPLE, *Basilarchia arthemis* Dru. This beautiful butterfly is fairly well distributed, and may be found from about June 11 to the middle of July, although I have seen worn specimens at the end of the latter month. Gosse in "The Canadian Naturalist," 1840, p. 306, however, records an example as late as September 4, which he concludes was only an occasional straggler, or one of an unusual late hatching.

THE VICEROY, *Basilarchia archippus* Cram. This handsome butterfly mimics the Monarch (*Danaus archippus* Fab.), and is one of the most striking cases of mimicry, which occurs in our fauna. It is by no

means plentiful here, only very few examples having been met with each season, and these for the most part on the roadside. During the present exceptional season (1919), I have only seen it once, on Aug. 7.

THE ACADIAN HAIR-STREAK, *Strymon acadica* Edw. Prior to the present year (1919) this was the only hair-streak I had met with at Hatley. I first found it in 1914 on the roadside, about two miles to the south of the village, but only in very limited numbers. From that date onwards I lost sight of it until July of the present year (1919), when I found it again in the same locality, but in rather increased numbers.

THE STRIPED HAIR-STREAK, *Strymon liparops* Bdv. and Lec. This is generally considered a somewhat rare little butterfly wherever it occurs, which remark is certainly true of it at Hatley, for I have never seen it until the present season (1919), and then only in two or three places, along the same roadside that the Acadian Hair-streak frequented. The two species were flying together, from about July 9-14 in about equal limited numbers.

THE WANDERER, *Feniseca tarquinius* Fabr. This apparently is another rare little butterfly here, for I have only come across two specimens of it so far, one on June 8, 1917, and the other on May 25, 1918. Only one species of the genus is known. While it is true that almost all the larvae of lepidoptera subsist upon vegetable food, nevertheless there are exceptions, one of which is the present species, whose slug-like larvae feed upon the woolly aphid of the alder.

THE SPRING AZURE, *Lycaenopsis pseudargiolus* form *marginata* Edw. Prior to the spring of 1919, I had only come across the form *marginata*, of this very polymorphic species, although Gosse in "The Canadian Naturalist," 1840, p. 123, speaks of it as *Polyommatus lucia*, by which it might be assumed he refers to the form *lucia* Kirby, and was unacquainted with *marginata*. Both *lucia* and *marginata* are winter forms, coming from chrysalids which have lived through the winter and are the first to appear in early spring. As already indicated, I have found *marginata* to be by far the commonest form, two examples only of *lucia* having been taken in May of the present year, 1919.

THE BLACK SKIPPER (*Thymele brizo*?) This name was used by Gosse on page 184 of his work. The reference may possibly be referable to the Sleepy Dusky-wing (*Thanaos brizo* Bdv. and Lec.), although the note of interrogation might allow of its being placed under *Thanaos icelus* Lint., (The Dreamy Dusk-wing), which latter I have found to be not uncommon here, whereas *brizo* is out of its habitat.

THE ARCTIC SKIPPER, *Carterocephalus palaemon* Pall. This little skipper, which is totally unlike any other species in the fauna, is described by Gosse in "The Canadian Naturalist," 1840, p. 219, as very rare near Compton, and I had held a similar view regarding it at Hatley, until June 4, 1918, when I first came across it in an open space in the centre of a little swampy wood, about a mile or rather more, to the north of the village. Later on I found it in some marshy ground, adjoining the meadow road to the east of the village, and in several other places as well. It seems strange I should never have come across it before, unless the above year was an exceptional one for the species, which I think it must have been, seeing that I have failed to come across it again during the present season (1919), (which might be described as a "skipper" year), when all the other members of the family have been unusually abundant.

THE LONG-DASH, *Polites mystic* Scud. So far I am unable to say very much about this skipper, having only come across it for the first time during the present season (1919). In point of numbers, however, it was nothing to be compared with those of the smaller members of the genus, such as the Yellow-spot and Tawney-edged skippers, besides which its distribution seemed much more restricted.

THE DUN SKIPPER, *Euphyes vestris* Bdv. This is another skipper whose presence was undetected until the present year, and looking to the general difficulty of capture, and identification in the field, I think this family probably offers more scope for additions to the Hatley list, than any other. As with the Long-dash, I am unable to say very much about its status, except that its distribution was more restricted, and numbers even less, than those of the former.

Possibly the remark in my paper on the Orchids of Hatley (OTTAWA NATURALIST, Vol. XXXII, 1919, No. 8, pp. 144-147) that the possibilities of the place had only been touched upon, so far as regards those lovely flowers, may apply equally well here to the butterflies, and that before long others will be found able and willing to extend the following list, the nomenclature of which is the same as that used by Barnes and McDunnough in their Check List of the Lepidoptera of Boreal America.

LIST OF THE BUTTERFLIES OF HATLEY, 1919.

PAPILIONIDAE.

- *The Black Swallow-tail, *Papilio polyxenes* Fabr.
- The Tiger Swallow-tail, *Papilio glaucus canadensis* R. and J.

PIERIDAE.

- The Grey-veined White, *Pieris napi* Linn.
- *The Cabbage Butterfly, *Pieris rapae* Linn.
- The Clouded Sulphur, *Eurymus philodice* Godt.

DANAIDAE.

The Monarch, *Danaus archippus* Fabr.

SATYRIDAE.

The Pearly Eye, *Enodia portlandia* Fabr.

*The Little Wood-satyr, *Cissio eurytus* Fabr.

The Eyed Brown, *Satyrodes canthus* Linn.

*The Clouded Wood-nymph, *Cercyonis alope* form *nephele* Kirby.

NYMPHALIDAE.

The Great Spangled Fritillary, *Argynnis cybele* Fabr.

The Silver-spot Fritillary, *Argynnis aphrodite* Fabr.

The Silver Bordered Fritillary, *Brenthis myrina* Cram.

*Meadow Fritillary, *Brenthis bellona* Fabr.

The Baltimore, *Euphydryas phaeton* Dru.

*Harris' Checker-spot, *Melitaea harrisi* Scud.

*Nycteis, *Phyciodes nycteis* Dbl. and Hew.

The Pearl Crescent, *Phyciodes tharos* Dru.

The Violet Tip, *Polygonia interrogationis* Fabr.

Hop-merchant, *Polygonia comma* form *dryas* Edw.

**The Green Comma, *Polygonia faunus* Edw.

The Gray Comma, *Polygonia progne* Cram.

The Compton Tortoise, *Aglais j-album* Bdv. and Lec.

The American Tortoise-shell, *Aglais milberti* Godt.

The Mourning Cloak, *Aglais antiopa* Linn.

*The Red Admiral, *Vanessa atalanta* Linn.

*Hunter's Butterfly, *Vanessa virginiensis* Dru.

*The Painted Lady, *Vanessa cardui* Linn.

The Banded Purple, *Basilarchia arthemis* Dru.

*The Viceroy, *Basilarchia archippus* Cram.

LYCAENIDAE.

*The Acadian Hair-streak, *Strymon acadica* Edw.

*The Striped Hair-streak, *Strymon liparops* Bdv. and Lec.

*The Wanderer, *Feniseca arquinius* Fabr.

The American Copper, *Heodes hypophlaeas* Bdv.

The Spring Azure, *Lycaenopsis pseudargiolus* form *marginata* Edw.* and form *lucia* Kirby.

HESPERIIDAE.

*The Northern Dusky-wing, *Cocceus pylades* Scud.

*The Dreamy Dusky-wing, *Thanaos icelus* Lint.

**The Black Skipper (*Thymele brizo?*)

The Arctic Skipper, *Carterocephalus palaemon* Pall.

The Tawny-edged Skipper, *Polites cernes* Bdv. and Lec.

*The Long-dash, *Polites mystic* Scud.

The Yellow Spot, *Polites peckius* Kirby.

*The Hobomok Skipper, *Poanes hobomok* Harris.

*The Dun Skipper, *Euphyes vestris* Bdv.

*Not recorded by Gosse.

**Recorded by Gosse but not yet verified.

A RARE FUNGUS NEW TO CANADA

BY W. S. ODELL.

While collecting fungi in the vicinity of Ottawa during the past year, for the Victoria Memorial Museum, one of the earliest forms found was the edible morel, *Morchella esculenta* Pers. Shortly after snow had left the ground and before leaves appeared on the trees and shrubs, its dark olive green or brownish cone was seen protruding a few inches above ground. It is fairly common, growing usually in damp situations, and lasts during May and part of June if the weather is favorable. Any one who has seen this peculiar fungus will remember and readily recognize it. It belongs to the order Ascomycetes, family Helvellaceae, and differs from mushrooms, puff balls, etc., in the manner in which its spores are borne. In mushrooms the reproductive bodies called spores, are borne, four in number, on ends of club-shaped bodies called basidia, covering both sides of the gills. The spores which are the seeds of the mushroom, are of various sizes; they are microscopic, but may be seen en masse by placing a specimen on black paper, tightly covered

with a glass jar to prevent air currents. After a few hours the paper will be covered with a whitish deposit, which consists of spores in inconceivable numbers. Spores are dispersed by the wind; some fall to the ground, and in process of time, it may be months, often years, produce under proper conditions, tiny thread-like jointed strands called "spawn" by gardeners, which grow through the substance on which the plant feeds. A familiar form occurs in white mould often seen on vegetables or on bread, and is better known as mycelium. It may be found by digging up young mushrooms or under matted leaves or in much decayed logs in the woods, permeating every part. In fact the mycelium is mainly responsible for the rapid decay of wood, and causes much loss annually to standing timber.

While in the form of threads mycelium is the vegetative stage of the mushroom. When the fruiting stage begins, small knobs appear on these strands, minute at first, varying from the size of a pinhead



Fig. 1, *Morchella esculenta*; 2, *Morchella esculenta*, section; 3, *Morchella bispora*; 4, *Morchella bispora*, showing partitions (P); 5, *Morchella bispora*, showing mycelium (M).

to that of a pea, growing larger all the while, making their way to the surface of the ground, when if conditions are favorable mushrooms will mature in a short time.

The cap or pileus of a mushroom is the expanded part; on its under side are gills or lamellae, thin plates radiating from the stem to margin of the pileus, affording a foundation on which club-shaped cells stand parallel to each other. The entire surface of the lamellae is covered with these cells, called basidia.

In Ascomycetes, including morels, the distinctive feature consists of spores enclosed in a long cylindrical tube or ascus. Like mushrooms, morels consist of two prominent parts, stem or stipe, and cap or pileus; but are very unlike them in general appearance. The pileus varies much in form being conical, ovate, rounded, bell-shaped, or cylindrical, and is always pitted. These depressions are usually regular, covering the entire outer surface, and are separated from each other by ridges with rounded blunt edges, thus forming a network assuming a honeycombed appearance.

Unlike mushrooms, the upper or exterior surface is the spore bearing part in morels, and spore sacs are developed on both ridges and depressions. The pileus is hollow, closed at the apex, and attached throughout its length to the sides of the stipe. In color it varies from shades of olive, to greenish brown, and light ochre yellow. Its stipe is hollow and continuous with the cavity of the pileus. It is stout, smooth, but covered with minute granular particles, and varies from $\frac{1}{2}$ to 1 inch in diameter. Its spores as before mentioned contained in an ascus, are smooth, hyaline, elliptical, standing obliquely, eight in a continuous row, varying in size from 19 to 22 microns long by 11 microns wide. The plant is from 2 to 4 inches high, but is often found larger.

The rare species referred to in the title of this article, namely *Morchella bispora* Sor., or the Two-spored morel, is a morel somewhat similar to the one described, but unlike it in several distinctive characteristics. Its surface is reticulated, with ridges running in a more regular longitudinal manner, and differs in having its pileus free from stipe along lower margin, but is attached to it at its apex. Its main difference, however, lies in the fact that its ascus contains only two exceedingly long spores, while all other morels have eight. The pileus is dark greenish brown in color, 1 to $1\frac{1}{2}$ inches long by 1 to $1\frac{3}{4}$ inches wide. Its stipe is stuffed with a pithy substance, at intervals of one-half inch, forming partitions, leaving hollow spaces between. It is cylindrical, very fragile, tapering to apex, straight, often slightly curved, easily separating from pileus, having base covered with a thick floccose substance

readily rubbed off. In size it is from 4 to 5 inches long, and from $\frac{1}{2}$ to $\frac{3}{4}$ of an inch thick, at widest part. Its spores are cream or light yellow, faintly granular, two in an ascus, often slightly curved, fairly uniform in width, exceedingly variable in length. They are narrowly-oblong, size 52-62 microns long by 14 to 17 microns wide.

Morchella bispora grows singly, under open hardwood trees, in rocky soil, among leaves; height from 4 to 6 inches. A few plants were found in Gilmour's grove, Chelsea, Que.; two in Armstrong's bush near Green's creek, and six in Billings' bush, both of these latter localities being in the province of Ontario, near Ottawa. After May 15, no more specimens were seen. Possibly if the surrounding woods were systematically searched in early spring, the range of its habitat might be extended. Considerable interest is attached to this species partly on account of its rarity, but mainly

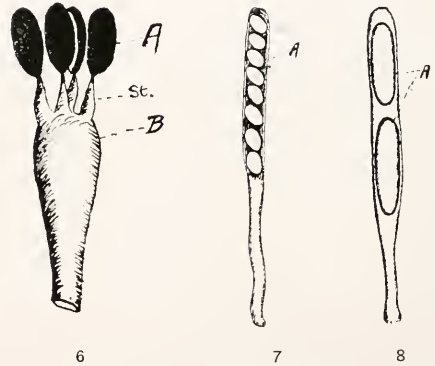


Fig. 6. Basidium of *Coprinus comatus* (A, spores; st., sterigmata; B, basidium); 7, ascus of *Morchella esculenta* (A, spores); 8, ascus of *Morchella bispora* (A, spores). All highly magnified.

because there is no record of its having been previously found in Canada.

All morels are edible, and in the writer's estimation surpass all other kinds of mushrooms, as a choice article of diet. They are not found in large numbers in the district of Ottawa, but are general around suburbs of the city in such places as the edges of woods, in grass, and in shady places. They have been found at Rockcliffe, at the Rifle Range, Experimental Farm, High Bridge over Rideau river, Wychwood, Lake Flora, and in the woods south of Lemay's lake.

There seems to be a popular misconception regarding the food value of mushrooms. From articles appearing in newspapers, one would be led to infer that their food value is high—that they could take the place of our staple foods, wheat, beans, flour or meat. Investigation proves that their edible value is not so high as is supposed. Careful analyses have been made of many species, and while there is con-

siderable variation in composition, the average is 85 to 90 per cent water and 10 per cent solid matter. In *Morchella esculenta* it is 89.54 per cent water, 10.46 solid matter; in the cultivated mushroom, *Agaricus campestris*, 91.8 per cent water, 8.2 per cent solid matter. This would place them on a par with cabbages and turnips, which are not generally considered as being highly nutritious.

Large quantities of edible mushrooms go to waste every summer. This is to be regretted since they are easily accessible. While some mushrooms have

an indifferent taste, most are of fine flavor, and would repay the trouble taken in collecting them. If their value as a delicacy were more generally known, sufficient numbers could be found all through summer, at the cost of a little exertion, to furnish an appetizing relish for many a meal.

Thanks are due to the late Mr. J. M. Macoun, Botanist of the Victoria Memorial Museum, for the photographs from which the accompanying plate has been made and to Prof. John Dearnsey, London, Ont., for identification of specimens.

A FABLE OF TO-DAY.

BY RALF RANGER.

Once upon a time there was an Old Naturalist. He was quite a good Old Naturalist too, and if you look in many of the books you will find many observations and the results of interesting and important investigations credited to him, and not a few monographs bear his name as author.

After some further years of work this Old Naturalist was about to write a book dealing with a good many different forms of animal life. One day he went up to a big museum and introduced himself to Mr. Flittin Nomen, the young expert in charge of the ornithological section.

"Ah, yes, sir," said Mr. Flittin Nomen, "I am extremely glad to meet you. I have always admired your monograph on *Planesticus migratorius*."

"Pardon me, but I could not have been the author of the work you refer to. I do not even know the species of which you speak."

"Yes, yes, but I mean your monograph on the American Robin."

"Oh, the American Robin. But is not the name *Merula migratoria*?"

"It has not been called *Merula migratoria* for a long, long time, for four years at the very least," said Mr. Flittin Nomen. "Your account of the habits of *Dendroica fusca*, too, I have always held in very high esteem."

"*Dendroica fusca*? I thought that I knew the genus *Dendroica* pretty well, but I know of no such species."

"It used to be called *Dendroica blackburniae*, but not for a long time, not for the last three years certainly. And you know," said Mr. Flittin Nomen, his eyes brightening, "it is really not worth your while learning the name *fusca* for this species, for I have recently made a great discovery—I have found that the specific name *alba* really has priority. That is the name used in the work published a week before the publication of *fusca* and consequently—"

"But this species is not *white*" exclaimed the Old Naturalist.

"Oh, that doesn't matter a bit, *alba* has priority by a *whole week*—think of that! It took me a long time, and much very careful research, to make sure of the exact week of publication of the two works, but I have confirmed it, and am proud to say that I have thus been able to make a very valuable contribution to science. I know that in the old days it was supposed that a scientific name should be in some degree descriptive of the species, or at least should not be entirely misleading in its significance, but that idea is now entirely out of fashion. *Alba* is undoubtedly a *lapsus calmi*, but that doesn't matter either, it has priority, and *that's the thing*."

"But is there no such thing as a nomen conservenda, thus allowing a name which has become thoroughly established to remain?"

"I believe there used to be, in ancient times, but such absurd ideas are entirely out of date."

The Old Naturalist turned to go.

"So very glad to have met you," said Mr. Flittin Nomen, "and I can give you a bit of advance information. I believe that I can prove that *Melospiza* is untenable for the Song Sparrows, and it should be *Rubraspizella*. It's really a very good job too, for they have been *Melospiza* long enough."

"Truly, 'the letter of the law and not the spirit'," murmured the Old Naturalist as he wandered off in the direction of the entomological section.

In the entomological section the Old Naturalist met the expert in charge, Dr. Changem Offen, and tried to converse with him, but as all the names the Old Naturalist used had to be dug up in a list of synonyms, there was little time left for discussion of life-histories, habits, habitats, economic status, and other points in which the Old Naturalist was interested, but which Dr. Changem Offen seemed to regard as of very secondary importance.

The Old Naturalist wandered on to the mammalogical section. Here he found the curator contemplating a tray of skins of the genus *Microtus*, while on the table lay a single specimen. After introducing himself, he enquired as to the identity of the specimen on the table.

"I don't know what it is," said the curator. "In fact, I am afraid it is impossible to say. You see it has lost its label, and without the locality I am entirely unable to say to what subspecies it belongs."

"But, if you cannot tell what it is without a locality label, it can hardly be worth bothering about," said the Old Naturalist.

"Oh, yes, indeed yes. That's not the point at all. If any two mammals come from different localities they *must* belong to different subspecies, whether we can see the differences or not, and we're all right, quite all right, as long as we have the labels."

"I thought that subspecies were named to facilitate reference, caused by climatic conditions, and that their chief interest lay in correlating these differences with the conditions under which they were produced."

"That, I know, used to be the old idea, but we have got far beyond that now, and we know that subspecies exist for each locality. It is a great improvement on the old method and quite simple as long as we have the labels."

The Old Naturalist left the curator hunting for his lost label, and proceeded to the botanical section. Here he introduced himself to Dr. Synn O'Nymm Seeker, Chief Taxonomist of the Order Rosales.

"I used at one time," said the Old Naturalist, "to be interested in the genus *Crataegus*. What is the situation in that genus at the present time?"

"The genus *Crataegus*?" exclaimed Dr. Synn O'Nymm Seeker, "why my dear sir, there is no such genus. It was discovered long ago that each of the old species of that so-called genus was really a separate genus, and that each of these separate genera had from fifty to a hundred species. But even this point of view is now obsolete, as Professor Splittem Finer has just found that every individual hawthorn is a distinct species and he is now engaged in the momentous task of going over the whole of North America tagging every tree with its own specific name."

The Old Naturalist turned sadly away. Poor old out-of-date chap! He returned to his home, spent the rest of his life in trying to catch up with a synonymy which got away from him in one group while he was working at another, and in trying in vain to find some rhyme or reason in the mass of published subspecies. So he wore himself out and died—and never wrote his book.

I remember the Old Naturalist well. He was a good worker and a progressive. He would have done even more practical field work if his time had not been so largely taken up in controversy with the conservatives of his day. However, we owe him a larger debt of gratitude than is generally realized. It was largely due to him a code of nomenclature was established which ended the existing practice whereby each individual crank was a law unto himself, the confusions from which we are only just straightening out to-day. He had a caustic pen too. His papers on *Turdus* vs. *Merula* in the old numbers of *Ornithologica* are classics of sarcasm and irony, and well worth occasional re-reading.

P. A. T.

NOTES ON THE NESTING HABITS AND FOOD OF PRAIRIE HORNED-LARKS IN MANITOBA.

BY NORMAN CRIDDLE, TREESBANK, MAN.

The notes presented below are largely from observations made during the spring of 1918, and owe their origin to the fact that I was unable, at that time, owing to ill-health, to devote my attention to the more strenuous work which usually falls to the lot of a field officer of the Dominion entomological service. As it happened, the horned-larks were nesting close at hand and, therefore, presented opportunity for study without fatigue to the observer.

The horned-larks of Manitoba have already been dealt with in this journal,* but as the present notes

add to what was previously written they seem worthy of record here.

Prairie horned-larks are the first birds to return to their summer homes from the south; they are usually with us in numbers by March 1 and at the end of that month are, as a rule, busily engaged in incubating a clutch of eggs. My 1918 records read somewhat as follows: April 18, young birds almost able to fly; April 30, young flying; May 3, nest with 3 eggs; young from this nest left on May 26. May 16, nest with 4 eggs, young hatched May 26 and left the nest June 4. On June 7, a nest with 4 eggs was discovered and on July 2 one

*Ottawa Naturalist, Vol. XXX, No. 11, Feb. 1917.

with 2 fresh eggs. On July 14 still another nest was located, this one having 4 eggs. At this last date males were singing everywhere and the time was undoubtedly one of general breeding. From these records it will be seen that there is a nesting period of at least four months, also that the birds rear three and perhaps four broods in a season. It is interesting to relate that while the birds do not, as a general rule, rear two families in the same nest, one pair did so, while another couple built a second nest within a few feet of the first. One nest, under close observation, contained young which left it in nine days after hatching, and though they were still unable to fly at that time they had, nevertheless, acquired considerable feathering. The nest to which I devoted most attention was situated quite close to the house and within easy vision from a window; it was built among chips and sunken, as usual, in the ground, the locality being one frequented by humans as well as by dogs and poultry. When either of the first two drew near, the brooding bird slipped quietly from the nest, apparently trusting to the color similarity of the young and the nest to the surroundings to keep them from harm, but when a hen came within reach the small bird flew at her with such vigor as to cause the hen to become seriously alarmed and make her leave in a hurry.

The young birds were attended by both parents from the time they were hatched until they left the nest and both adults took an equal share in feeding their offspring, as well as cleaning the nest. As it began to grow dark the female fitted herself over the young for the night while the male after singing in the twilight went to rest in the vicinity.

Judging from the observations made in 1918, it would seem that the food of young prairie horned-larks consists very largely of cutworms which the parent birds dig out of the ground by aid of their beaks. The locating of these insects is performed with remarkable accuracy though it is due to a knowledge of the insects' haunts rather than to a perception of the exact situation in which they rest. Thus, parent horned-larks were seen, repeatedly, searching around clumps of weeds which were more or less isolated through being surrounded by bare spots, these being the situations which our observation have shown are most frequented by cutworms. The time occupied in securing one of those insects naturally varied, but on an average required rather less than four minutes. A pair of birds watched on June 4, feeding young a week old, and commencing at sunset, visited the nest with food on an average every two minutes. Judging from these and other observations we can, therefore, estimate the total number of cutworms consumed in a day at fully 400; in other words, nearly 3,000 a week, and

this does not take into consideration the number of insects eaten by the adults which would add considerably to the total.

Cutworm hunting is naturally a daylight occupation and since it continues until dark there is every reason to suspect that it commences soon after dawn, especially as the male birds begin to sing at the first indication of returning day. The birds I had under observation abandoned their work as the day grew dark.

A few mornings after the records mentioned above were taken, I found the young still in position in the nest, but at 8 a.m. the largest and oldest nestling followed its mother away and was soon after lost in the herbage, neither birds being seen again. The male continued to feed the remaining two until five minutes after nine, when the next largest followed him away. The third nestling was smaller than the others and I fully expected that it would be left to perish as often happens when food is scarce. For a time the male continued to devote all his attention to the one that had followed him but eventually he returned to the nest with a cutworm and shortly after with yet another. Feeling sorry for the hard worked little bird I placed five full sized cutworms on the edge of the nest and then awaited developments. The male soon returned with the usual fare, and then spying the insects placed near, he stuffed four of them in succession down the throat of his greedy charge, taking the last grub to the other bird. He continued to labor on behalf of both young until shortly after eleven o'clock when the remaining nestling followed him away.

The habit of the male bird continuing to support both young after the female had evidently deserted them is naturally a very important characteristic providing it is one that is generally followed. The question remains, would he have attempted to do so had food been scarce? The evidence is in the negative. It is common knowledge to those who have studied horned-larks that they seldom rear more than one of the first brood, the reason for this is apparently the scarcity of insect food at that time, especially the scarcity of cutworms. During June cutworms are at the height of their season and, therefore, the birds find little difficulty in rearing the full allotment of young. July is also a favorable month owing to the presence of locusts and caterpillars of various kinds.

The food of adult horned-larks is less insectivorous than is that of the young and is at least in part made up of seeds and sprouted plants of various kinds, but from the fact that enormous flocks of these birds sometimes continue on the grain fields for two or three weeks in spring time without doing

any appreciable harm we must conclude that they are either eating weed seeds or insects. We know that before the spring really opened that horned-larks partook daily of the weed seeds placed for them. This is doubtless why they became tame

and later nested nearby. We have also seen them repeatedly devour cutworms during the nesting season so that the evidence of their usefulness seems to be without question.

BRIEF REPORT OF THE OTTAWA FIELD-NATURALISTS' CLUB FOR THE YEAR ENDING DECEMBER 2, 1919.

At the March, 1919, annual meeting of the Ottawa Field-Naturalists' Club, the constitution was amended to make the club year coincide with the calendar year, and, therefore, each future volume of the club publication will cover one calendar year instead of parts of two as in the past. In spite of the fact that owing to this change in the constitution, the past year—the fortieth of the existence of the Ottawa Field-Naturalists' Club, covering a period of only nine months—was the most successful in the recent history of the society, which now has a membership of 644, or more than double that of 1917.

The club activities are directed toward the popularizing and the diffusing of knowledge of the natural sciences, and are carried on in three chief ways: a course of lectures, two series of field excursions, and the publication of *THE CANADIAN FIELD-NATURALIST*.

Owing to the short year the lecture programme was not begun prior to the annual meeting. A list of thirty-six lectures to be given by club members has been sent to local societies, clubs, churches and schools from which they may select and request desirable talks.

The eight field excursions were well patronized, the average attendance being 23. Scientific men attended the excursions to direct interest and answer questions.

THE CANADIAN FIELD-NATURALIST, the official organ of the club which has completed its thirty-third volume, is also now being used as a medium of publication by the four affiliated societies listed on the cover.

At a recent meeting the council was informed that Mr. R. B. White had bequeathed the club one hundred dollars per year, which will be allowed to accumulate along with other funds in trust to form the nucleus of a trust fund the interest of which will eventually be used to promote natural history research work in Canada.

The officers and committee for the year 1920 are as follows:

President, M. Y. Williams; Vice-Presidents, L. D. Burling, R. M. Anderson; Secretary, Clyde L. Patch; Treasurer, Miss E. B. Crampe; Editor, Arthur Gibson.

Additional members of Council: Hayes Lloyd, W. T. Macoun, G. A. Miller, Miss M. E. Cowan, C. B. Hutchings, C. M. Sternberg, H. I. Smith, P. A. Taverner, E. Sapir, F. W. Waugh, E. M. Kindle, W. J. Wintemberg, R. E. DeLury, F. Johansen.

STANDING COMMITTEES OF COUNCIL.

Publications—Clyde L. Patch, A. Gibson, L. D. Burling, H. Lloyd, F. Johansen.

Excursions—F. W. Waugh, C. M. Sternberg, G. A. Miller, Miss M. E. Cowan, C. L. Patch, C. B. Hutchings, W. T. Macoun, H. Lloyd, F. Johansen.

Lectures—R. M. Anderson, P. A. Taverner, L. D. Burling, W. T. Macoun, G. A. Millar.

Trust Funds—W. T. Macoun, C. Gordon Hewitt, H. M. Ami.

Auditors—J. Ballantyne, E. C. Wight.

LEADERS AT EXCURSIONS.

Archaeology—Harlan I. Smith, F. W. Waugh, W. J. Wintemberg, Dr. C. M. Barbeau, Dr. E. Sapir.

Botany—G. A. Millar, W. T. Macoun, Mrs. A. F. Brown, Dr. M. O. Malte, J. R. Dymond, E. C. Wight, Miss M. E. Cowan.

Entomology—C. B. Hutchings, Arthur Gibson, J. M. Swaine, F. W. L. Sladen, Miss Crampe.

Geology—Dr. E. M. Kindle, Dr. M. Y. Williams, H. McGillivray, L. D. Burling, E. Poitevin, Dr. M. E. Wilson.

Ornithology—P. A. Taverner, C. L. Patch, Dr. M. Y. Williams, A. G. Kingston, Hayes Lloyd.

Zoology—Dr. R. M. Anderson, A. Halkett, C. L. Patch, E. A. LeSueur, C. H. Young, C. E. Johnson.

Photography—W. S. Hutton.

NOTES AND OBSERVATIONS

THE YELLOW-THROATED VIREO NEAR SEELEY'S BAY.—This bird is usually looked on as rather southern in Ontario, and I was a little surprised to hear its well-known and easily distinguished song in the woods near Seeley's Bay while motoring to Ottawa on July 3, 1919. On looking up the records I find that there are many reports of its occurrence in eastern Ontario, but that observed on the above date is the first one that I remember to have seen myself, and perhaps the occurrence is worthy of record.

W. E. SAUNDERS.

A NEW MAMMAL FOR CANADA.—In the summer of 1890 the writer, with Dr. F. A. Saunders, was collecting mammals at Ottawa, and among others we were after bats. On the evening of July 10, we took in "Clarke's woods," immediately northwest of the Observatory gate of the Experimental Farm, a little brown bat, and unfortunately, we managed to lose the skull. Recently, I was sending some specimens for identification to Washington, and decided that the little bat was sufficiently different to be identified without the skull, so I included it.

The answer comes back that it is the *Pipistrelle*, *Pipistrellus subflavus*, and the first to be taken in Canada. It does not differ from the specimens taken in New York state near Lake George, and that general region, the only source of records up to the present.

This bat may now be looked for in all the territory between Ottawa and the St. Lawrence, and ought to be found at Montreal.

The little known bats are near enough alike to be a moderate puzzle to those who do not know them, but most species can be readily picked out by the initiated. We have in Ontario *Eptesicus fuscus*, *Myotis subulatus*, *M. lucifugus*, and probably *Nycticejus humeralis*, besides the additional species noted above.

W. E. SAUNDERS.

PHENACOMYS INTERMEDIUS FROM HIGH RIVER, ALBERTA.—Among a small number of mammals sent to Washington for identification, one is returned with the above label. I have been hunting for specimens of this genus for years, and it is a sad commentary on one's acuteness to find that an example has been taken and remained unrecognized!

It was with a lot of *Microtus* living in a shrubby valley, and is really remarkably like some members

of the other genus taken there and in the nearby regions. When I showed the specimen to a noted mammalogist he said at once that he recognized *Phenacomys* roughly by the long thick fur, but immediately he found that *Microtus drummondi* from the same locality was indistinguishable. The root characters of the teeth turn out to belong to very old individuals only, and this leaves the younger, though fully grown adults, in the class of "very difficult to identify."

The tail is short, but so are tails of *Microtus* found alongside. To illustrate the difficulty the following measurements are of several specimens:

	Length.	Tail.
854 <i>Phenacomys</i>	123	27
882 <i>Microtus minor</i>	118	26
880 " <i>drummondi</i>	126	35
884 " <i>minor</i>	127	29
885 " "	127	29

W. E. SAUNDERS.

BREWER'S SPARROW IN SASKATCHEWAN AND ALBERTA.—In a recent issue of the *Condor*, there is a record of the occurrence of this sparrow in Alberta, and it is given as the first record for the province. When I looked it up in Macoun's *Birds of Canada*, I was surprised to find that the claim is correct. My impression had been that it was fairly well known and widespread near the Alberta-Saskatchewan line, but in this I was mistaken. Moreover, I find that I have failed to find it three times when on what might be considered to be favorable ground in those provinces, namely, at Gull Lake, Sask.; High River, Alta., and Dunmore, Alta. On Sept. 1, 1896, I took a specimen, my first, at Maple Creek, Alta., and my records do not show any others observed on that day. I did not meet with it again until June 9, 1906, when my train was delightfully held up all day at Cummings, in the dry region of Saskatchewan, owing to a "washout." The other passengers fretted, but to me it was a great chance. In my wanderings through the muddy plains that day. I found two nests of Brewer's sparrow and took two male birds, and heard and saw many others. These are now in my collection and measure 138, 64, 56, 18 and 140, 65, 61, 17.

These birds were inhabiting a sage brush country, and the nests were in sage at about a foot from the ground. They resembled those of the field and chipping sparrows, and the eggs are of the same type.

W. E. SAUNDERS.

PUSS IN A SPARROW CHASE.—Our family cat doubtless has figured in other sparrow chases—of her own instituting, but I want here to introduce her as a star actor in a real humanly-conducted chase, such as the boys in some communities at least, are all familiar with.

As everyone knows, the noisy, quarrelsome, hungry, dirty, little English or house sparrow becomes an intolerably numerous and annoying nuisance at times. To keep him within some sort of bounds, shooting, poisoning, and other means must be employed, and as I have intimated, these various measures may be applied in concert by a whole community. A sparrow chase is ordinarily launched by the choosing of sides, usually in the winter season, when other birds are out of harm's way.

On one occasion Puss entertained us to some rather extraordinary behavior, and set us wondering just what goes on in the mind of a mere cat. When our quest of sparrows one night, took us up into the barn, we found Puss there ahead of us on a like errand, experience having taught her that occasional stragglers might be had for the taking. Being an old pet, our proceedings did not disturb her much, and she looked on quietly, until presently escaping sparrows, blundering about the mows, aroused her interest. In the fitful light of our lanterns the birds would sometimes find new roosting places under the roof, but as often as not they would settle where quite accessible to us, or the cat. The latter was quick to see her advantage, and would spring after a passing sparrow, or marking its course, would pick her way along the framework or across mows, to reach its new resting-place. She was soon fairly beside herself over the novelty of the situation; at least that is how we charitably accounted for some of her eccentric doings. Time and again on capturing a bird, she hurried directly to us, and dropping it at our feet, proceeded to divide her attention between jealously guarding her precious booty, and rubbing herself furiously about our legs. Evidently she knew she "hadn't ought to" trust us humans so far, and yet she was consumed with a desire to manifest her delight, and we were the only beings about to show any adequate appreciation of her magnificent prowess. We surely did lionize her, seeking in so doing to hold her attention sufficiently to enable us to appropriate the sparrow's head before she should take the notion to eat it. The head was all we wanted, but when we feared her appetite might begin to fail, we deftly slipped an occasional bird out of sight, and took care to get her in-

terested in the chase again as quickly as possible. For several nights the comedy was repeated, Puss retaining her inordinate vanity, or whatever we call it, to the end of our operations in this barn. Once in a while, through a lurking suspicion of us, or some other whim of her own, she was ready to ignore us, and make a meal of her capture by herself, but usually coaxing was effective, when her own motives would not have brought her.

I have thought it worth while to record this, because, while a cat with a bird or mouse will often show a certain degree of friendliness, I have never seen or heard of anything to compare with this demonstration. On a couple of occasions I have known a cat with young kittens to behave in a somewhat similar manner. After keeping them carefully secreted for a time, she one day displays unusual attachment to a human friend, persisting in her attentions until she succeeds in drawing him, with evident purpose, to their hiding place—another instance, it would seem, of some overwhelming hunger after human sympathy or commendation, which domestication has placed there.

HERBERT GROH.

ALBERTA NATURAL HISTORY SOCIETY.—The 14th annual meeting of the society was held at Red Deer, on Friday, Nov. 28, 1919.

At the afternoon session the usual business was transacted, including the reading and passing upon of the report and financial statement of the secretary-treasurer, and the election of officers for the ensuing year, viz: Hon. President, Hon. D. Marshall; Hon. Vice-President, Mr. J. J. Gaetz, M.P.P.; Second Vice-President Mr. H. A. Craig; President, Mr. F. C. Whitehouse; Vice-President, Mrs. W. A. Cassels; Second Vice-President, Dr. H. George; Directors, Mrs. George, Mrs. Pamley, Mrs. Root, Mr. E. Wilton, Mr. C. H. Snell, Mr. W. F. Harris; Edmonton, Messrs. K. Bowman, F. S. Carr, D. Mackie.

At the evening session the following papers were read: The executive report, Mrs. Cassels; Annual entomological report, dealing with insect pests, Mr. Whitehouse; The crow family, Dr. George, illustrated with specimens and eggs; Birds of Flagstaff, Alberta, Mr. Fleming, of the University staff, Edmonton.

During the year the following papers were given:

Feb. 31—Notes of a survey tour down Peace river and through the Peace Delta, 1916, Mr. C. H. Snell.

March 28—Butterflies of Alberta, demonstrating

the use of a microscope for showing specimens, Mr. F. C. Whitehouse.

Sept. 26—Edible fungi, Mrs. Powell.

In January a meeting was held at Wetaskiwin and special papers were given by members from Red Deer.

The Society's publication of "Dragonflies

(Odonata) of Alberta" by F. C. Whitehouse, 1918, was followed this year with "Annotated Check List of the Macrolepidoptera of Alberta," by Mr. K. Bowman.

The society's report is published annually in the Report of the Provincial Department of Agriculture.

BOOK NOTICES AND REVIEWS.

SIX NEW FISHES FROM NORTHWESTERN CANADA. By Francis Harper and John Treadwell Nichols. Bulletin of the American Museum of Natural History, Vol. XLI, Art. 11, pp. 263-270, plate XV. New York, Sept. 22, 1919.

A collection of fishes made by Francis Harper, while on an expedition of the Geological Survey of Canada to Great Slave lake in 1914, in company with Charles Camsell "An Exploration of the Tazin and Taltson rivers, Northwest Territories," by Charles Camsell, Memoir 84, Geol. Series 69, 1916, pp. 1-124, plates 18, map 1), has been found to comprise fifteen species, represented by approximately 120 individuals. Although previous collections of fishes from the region had been scanty and the material in poor condition, the collection described contained a surprisingly large proportion of previously unknown species. The new species described are as follows:

Catostomus richardsoni Harper and Nichols. Richardson's Gray Sucker; "Gray Sucker." Type locality, Taltson river, at its junction with Tazin river, south of Great Slave lake. Geographic range, Mackenzie and Winnipeg (?) Basins. Although this species was discovered by Dr. Richardson, it has been either disregarded or considered identical with various other species for nearly a century.

Opsopocodus borealis Harper and Nichols. Athabasca Minnow. Type locality, Lake Athabasca, at Fort Chipewyan, Alberta. Type specimen, No. 1048, Victoria Memorial Museum, Ottawa.

Coregonus preblei Harper and Nichols. Preble's Whitefish. Type locality, Tazin river, about one mile above its confluence with the Taltson river. Type specimen, No. 1038, Victoria Memorial Museum, Ottawa.

Leucichthys entomophagus Harper and Nichols. Tazin River Cisco. Type locality, Tazin river, at the foot of Kolethe rapids. Type specimen, No. 1021, Victoria Memorial Museum, Ottawa.

Leucichthys athabasca Harper and Nichols. Cisco of Lake Athabasca. Type locality, Lake Athabasca, at mouth of Charlot river, northern

Saskatchewan. Type specimen, No. 1020, Victoria Memorial Museum, Ottawa.

Leucichthys macronathus Harper and Nichols. Cisco of Great Slave lake. Type locality, Shore waters of Great Slave lake, near Fort Resolution. Type specimen, No. 1031, Victoria Memorial Museum, Ottawa.

All but one of the above are valuable food fishes. The commercial use of these fishes is becoming more important as settlement advances into this borderland of the north, and the work of Mr. Harper is an indication that much is to be expected when the fish fauna of the region is more thoroughly examined scientifically.

R. M. ANDERSON.

THE BIRDS OF THE RED DEER RIVER, ALBERTA, by P. A. Taverner. Reprinted from the *Auk*, January and April, 1919. A report of work done on and near the Red Deer river in the summer of 1918, by the author, assisted by the keen intelligence of Mr. C. H. Young, both of the Geological Survey staff.

The party floated down the river in a rough but roomy and competent boat made for the purpose, of which the author says that he knows of no important detail where a change would have been advantageous. Camps were made at convenient locations for several days at a time, and each locality was worked as thoroughly as time and circumstances permitted. A map is attached, showing the location of the various camps, and the topography of the country in general.

The present account, including additional information available from local sources, doubtless includes most of the breeding birds of the region. A commendable feature of the report of the expedition is the treatment of the matter of geographical variation, that bugbear of the field naturalist. There are specialists whose energies are (or appear to be) wholly devoted to the discovery of infinitesimal shades of difference between examples of a species from different habitats, and far be it from us to hint that theirs is not a useful niche in the world of ornithology, but the results

of their work are often a thorn in the side, until we become sufficiently calloused to ignore them. Taverner is a radical, and realizes that varietal differences are not always items of the highest importance and goes on his way in blissful carelessness of what some other members of the ornithological world may think or say of his conclusions. It is thus that progress is made, and the present writer finds it difficult, or impossible (?) to criticize such an attitude severely, being too strongly tinctured with that same spirit of radicalism himself.

One evident lack in the preparations for the trip, was the providing of a pair of competent listening ears, for while the sight records of the party are beyond criticism, there are omissions which a pair of good ears might have prevented. Sprague's skylark, for instance, probably delivered its song within hearing, dozens of times, before the bird was added to the list at Camp No. 11, while the Yellow rail lives in most favorable marshes in the district traversed, and needed only to be listened for, to be added.

What the party may have lacked in this regard was fully made up by the keen diligence with which the objects of the expedition were pursued, and the members are to be congratulated on the results obtained.

One must not forget to mention the photographs with which the report is illuminated. To take such views, one needs a keen artistic sense as well as an accurate knowledge of the capabilities of the camera, and both of these the author has with him on the spot, and used them with the very best results. Seldom indeed, is an article read which is illustrated with pictures of such beauty, and which, at the same time, convey to the mind such a clear perception of the country explored.

As a whole, the paper makes a fine starting point for the further study of the birds of that part of Alberta.

W. E. SAUNDERS.

In the *Auk* for July, 1919, are the following titles of Canadian interest:

SOME NOTES ON THE DRUMMING OF THE RUFFED GROUSE, by H. E. T. Trotter, pp. 325-339. This recounts personal experience with, and the study of, the drumming of this species and is an important and interesting contribution to a question that has long been of interest and an object of considerable controversy amongst observers.

THE SINGING TREE, OR HOW NEAR TO THE NEST DO THE MALE BIRDS SING? by H. Mousley, of Hatley, Que., pp. 339-348. This is an account of the methods pursued by this notable warbler nest-finder. The substance of the article is that the

male bird has usually a regular habit of singing from a favorite perch, as a rule within twenty yards of the nest. The discovery of a bird habitually singing through the nesting season from a certain point considerably limits the area to be searched for in finding the nest. By carefully watching this area centered on the "singing tree" Mr. Mousley has probably found more warbler nests in the past few years than any one else in an equal time in Canada. The article is a valuable contribution to field methods and to our knowledge of bird habits and should be read by all interested in the field study of birds.

In NOTES ON NORTH AMERICAN BIRDS, pp. 406-408, Harry C. Oberholser concludes that our American Pipit should be reduced to a subspecies of the Old World *Anthus spinoletta* and should be called *Anthus spinoletta rubescens*. He also pleads for the recognition, not at present accorded it, of the Kennicott Willow Warbler as a subspecies of *Acanthopneuste borealis*.

In GENERAL NOTES, under the title of—

THE GENERIC NAME OF THE GANNETS, p. 417, Harry C. Oberholser recommends the adoption of Mathew's proposal to split the genus *Sula* but following the Code of Nomenclature of the A.O.U. decides contrary to him that the name *Moris* is the proper term for the division including our Gannets. *Sula bassana* would thus become *Moris bassana*.

THE STATUS OF THE GENUS ARCHIBUTEO, p. 420, the same author, states that further investigation induces him to agree with Hartert's proposal to unite this genus with *Buteo* as in the feathering of the tarsus, the most important character of *Archibuteo*, it intergrades with it. He, therefore, recommends that *Archibuteo* be reduced to subgeneric rank or dropped altogether in which case our two species would stand as *Buteo lagopus sanctijohannes*, American Rough-legged Hawk, and *Buteo ferrugineus*, Ferrugineous Rough-legged Hawk.

P. A. TAVERNER.

PUBLICATIONS OF THE AMERICAN MUSEUM OF NATURAL HISTORY.—The Ottawa Public Library recently received for the Field-Naturalists' Club, the following three books, from the American Museum of Natural History:

"Illustrations of the North American species of the Genus *Catocala*."

"The Indigenous Land Mammals of Porto Rico, Living and Extinct."

"Equidae of the Oligocene, Miocene, and Pliocene of North America, Iconographic Type Revision."

These memoirs have been placed with the Field-Naturalists' collection and may be examined on application.





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No. 2

LAKE-SHORE BIRD MIGRATION AT BEAMSVILLE, ONTARIO.

BY HAMILTON M. LAING, PORTLAND, OREGON.

The following field notes were gathered during the summer and autumn of 1918. While in the service of the Royal Air Force the writer was stationed upon the south shore of Lake Ontario almost due north of the town of Beamsville. Here in checking the aerial gunnery practice six or seven hours were spent daily up in a fifty-foot tower at the water's edge. Periods on duty ranged from daylight until dark. As every day was spent largely out-of-doors and duty commenced on alternate mornings at dawn, excellent opportunity for observation was afforded. A rough bird census was taken daily and new migrants and disappearances thus noted.

The country surrounding the tower and within range of the field glasses consisted of the open lake northward, and to the south stretched a flat typically peninsular farming land of fields and orchards interspersed with remnant wood lots. Most of the notes were gathered from the tower; unless otherwise stated, each record following may be so taken. A few birds were noted in the woods to southward that did not show themselves close to the water.

The course of migration here was from east to west. A great many birds followed the shore and it was plain very early in the season that this was a pathway. Many expected species, however, notably the hawks, were disappointments, and the following gleanings may be as noteworthy for their omissions as their records. Nearly all migrants chose the fine days for moving and almost invariably passed during the early morning hours, or before 9 a.m. There was little movement in the afternoon. The bobolinks, bluebirds, blackbirds, snowflakes, horned larks, waxwings, pipits and swallows made a procession of it here; other species were more retiring and veiled their movements. Birds not mentioned in the following list were not seen in the autumn. No specimens were taken. Where any doubt existed in the mind of the writer, the record is marked so (?). The number in italics after the date gives the number of birds seen. The last notes were made November 26.

Colymbus auritus, Horned Grebe. Oct. 5, first noted; small company. Oct. 13, hundreds occupying waters near shore for several miles. They became quite callous to machine-gun fire and were very numerous till the end of the month. Only on rare occasions was one of these divers noted in flight. Numbers declined as follows; Nov. 6 (50); Nov. 8 (50); Nov. 16 (1); Nov. 18 (few); Nov. 26 (1).

Gavia immer, Loon. Aug. 10 (1); Aug. 20 (1); Sept. 30 (1). During October seen almost daily and often in flight. Nov. 1 (2 in flight); Nov. 6 (young); Nov. 11 (1); Nov. 19 (one flying high south-east across the peninsula).

Larus argentatus, Herring Gull. Aug. 17 (6)? Owing to the difficulty in distinguishing this from the next species, no exact record could be kept.

Argentatus was noted in September and October but very sparingly, and in November the numbers rose and fell apparently with the weather. Nov. 4 (numerous); Nov. 7 (beautiful adult picked up on shore); Nov. 20 (numerous); Nov. 26 (adult and young).

Larus delawarensis, Ring-billed Gull. Much more common than the preceding species up till November. July 21, July 28, Sept. 26, Oct. 13, Oct. 17, Oct. 19 (young); Oct. 23, 26 and 29 (numerous); Nov. 10.

Larus philadelphia, Bonaparte's Gull. Oct. 13 (flock); Oct. 17, Oct. 31, Nov. 1 (flock). Observed also Nov. 2, 3, 4, 6, 7, 10 and 18. Unlike the larger gulls, this bird almost invariably was posting west close to shore.

Sterna caspia, Caspian Tern. Sept. 4 (3); Sept. 25 (2). One of these birds in the first instance and both in the second were travelling east fairly close to shore.

Sterna hirundo, Common Tern. Aug. 19 (12); Aug. 22 (3); Aug. 25 (2); Sept. 6 (flock); Sept. 17 (11); Oct. 1 (20); Oct. 2 (three flocks). In nearly all cases moving westward, low.

Phalacrocorax dilophus, Double-crested Cormorant. On Nov. 21, 23 and 24, a lone bird, doubt-

less this species, took perch on one of the floating targets. Machine-gun fire from the air did not seem to interfere with his fishing.

Merganser americanus, American Merganser. Suspected in the distance more than once, but none of the mergansers were positively identified in the autumn.

Anas obscura, Black Duck. The commonest duck noted on this shore. Noted plentifully from first appearance July 26, until November. Large flocks on the lake Sept. 15. Last noted Nov. 4.

Mareca americana, Baldpate. Sept. 26?

Spatula clypeata, Shoveller. Sept. 19 (2).

Dafila acuta, Pintail. Sept. 20 (3); Oct. 18 (flock); Nov. 1 (1).

Aythya marila, Scaup. Sept. 27 (flock)?.

Clangula clangula americana, American Golden-eye. Oct. 26 (flock); Nov. 4, Nov. 5, Nov. 10 (flock); Nov. 26 (3).

Charitonetta albeola, Buffalo-head. Nov. 7 (3); Nov. 10 (several).

Harelda hyemalis, Old Squaw. Nov. 4 (flock of 35); Nov. 10 (several).

Oidemia deglandi, White-winged Scoter. One of the common ducks. Oct. 8 (flock); Oct. 17, Oct. 18, Oct. 23 (small flock); Nov. 4, Nov. 10 (2); Nov. 21 (6); Nov. 26 (1).

Branta canadensis, Canada Goose. Oct. 7 (20); Oct. 18 (43); Nov. 2 (small flock); Nov. 5 (14); Nov. 8 (6). Three of these flocks when observed were in migration and followed a south-easterly course toward Niagara.

Ardea herodias, Great Blue Heron. July 22 (2); July 23 (2). During August seen singly almost daily, usually going west, low over the water. Not noted between Aug. 22 and Oct. 15. Oct. 15 (1); Oct. 27 (1). None were seen to stop here.

Butorides virescens, Green Heron. July 27 (2); Aug. 13 (2); Aug. 16 (1). These two birds were noted at their fishing along the little creek that flowed by the foot of the lower tower.

Nycticorax nycticorax naevius, Black-crowned Night Heron. Aug. 10 (1); Aug. 31 (1). These followed the shore in the evening.

Arenaria morinella, Ruddy Turnstone. Aug. 13 (1). Noted resting on the gravelly beach.

Numenius hudsonicus, Hudsonian Curlew. July 31 (15); Aug. 5 (1); Aug. 6 (small flock); Aug. 7 (4); Aug. 10 (15); Sept. 8 (3); Oct. 1 (2)? Those noted Sept. 8 were travelling east; the others were going west; none were seen to stop on this shore.

Bartramia longicauda, Bartramian Sandpiper. July 25, Aug. 9 (2); Aug. 10 (2). This species bred locally not far from the tower. The bird observed July 25 either came across the lake or made

a wide circuit over the water, as he was noted coming inland several hundred yards. The others were high in air and travelling westward.

Actitis macularia, Spotted Sandpiper. The commonest shore bird in this section. Bred plentifully; very numerous through July and August, the numbers dwindling early in September and by the 11th of the month was gone. A doubtful record Sept. 19. This bird gave no hint of his manner of leave-taking; it simply disappeared.

Calidris arenaria, Sanderling. Aug. 1 (3)? In flight low over water, west-going.

Squatarola squatarola, Black-bellied Plover. Aug. 10 (2); Aug. 23 (flock); Aug. 29 (1). On Aug. 2, the two plover were noted in company with eleven curlews. These plover did not rest here; all were observed west-going.

Oxyechus vociferus, Kildeer. July 23 (7); July 30 (several); Aug. 5 (1); Aug. 7 (2); Oct. 6 (1). The seven observed on July 23 were most probably a family. They were out over the water a considerable distance (300 yards) and were winging off westerly, evidently on a mission.

Aegialitis semipalmata, Semipalmated Plover. Aug. 7 (7); Aug. 12 (5). The first group noted were old and young. They did not use this shore as a stopping-place, but went by low as the other shore birds did.

Totanus melanoleucus, Greater Yellowlegs. Aug. 1 (1)? Only a fleeting glimpse of this bird was secured though his notes were heard. No other Yellowlegs were observed throughout the season.

Bonasa umbellus togata, Ruffed Grouse. Observed in woods back on rocky ridge. During the "mad" season in October a bird of this species was reported in the orchard near the tower. It was not seen by the writer.

Zenaidura macroura, Mourning Dove. Common through July, August and September. Noted also Oct. 4 and Oct. 13. The latter observation was peculiar for at this date a fledgling barely able to fly was discovered.

Pandion haliaetus carolinensis, American Osprey. Sept. 20, a beautiful adult hunted near the shore during the afternoon and disappeared to eastward.

Circus hudsonicus, Marsh Hawk. An old male in grey plumage came occasionally to hunt in a nearby field. Noted July 25, July 30, Aug. 29, Sept. 10. Doubtless always the same bird. One young bird was seen here also, but the date was not recorded.

Accipiter velox, Sharp-shinned Hawk. Nov. 23 (1)?.

Accipiter cooperi, Cooper's Hawk. Sept. 17 (1)?; Oct. 12 (1); Nov. 30 (1).

Buteo borealis, Red-tailed Hawk. Sept. 18 (1)?.

Falco sparverius, American Sparrow Hawk. Bred locally, but no birds were observed in migration along the shore.

Buteo swainsoni, Swainson's Hawk. Sept. 2 (1)? Possibly a Red-shouldered Hawk, *Buteo lineatus lineatus*. Field description reads: "Yellowish below; darker towards breast; little brown marking on under parts."

Megascops asio, Screech Owl. Oct. 9, heard hooting in the orchard close to the tower at night.

Coccyzus erythrophthalmus, Black-billed Cuckoo. One of these birds evidently nested near the tower as it was observed carrying food over a regular beat. Disappeared July 22 and none seen later.

Ceryle alcyon, Belted Kingfisher. Aug. 17, Aug. 30, Oct. 3, Oct. 13. Always noted singly; never in migration.

Dryobates pubescens medianus, Downy Woodpecker. Sept. 14, Sept. 20.

Dryobates villosus, Hairy Woodpecker. Nov. 2, heard his loud call in the woods a mile south of the lake. Not noted on the shore.

Colaptes auratus luteus, Northern Flicker. Sept. 20 (1).

Melanerpes erythrocephalus, Red-headed Woodpecker. Aug. 26. This bird like the flicker, though breeding locally close at hand, did not appear on the shore more than once in migration.

Sphyrapicus varius, Yellow-bellied Sapsucker. Sept. 29. On this date a young bird was noted in the woods back of the ridge. Not noted on the shore.

Chordeiles virginianus, Night Hawk. Aug. 21 (3); Aug. 24 (8); Aug. 27 (2); Aug. 31 (2); Sept. 3 (1); Sept. 6 (1); Sept. 9 (1); Sept. 23 (1). These followed the usual westerly course.

Chaetura pelagica, Chimney Swift. July 28 (4); July 31 (4); Aug. 17 (15); Aug. 29 (numerous); Sept. 1 (2); Sept. 2 (2); Sept. 3 (1); Sept. 4 (1); Sept. 5 (3); Sept. 7 (5); Sept. 9 (2); Sept. 17 (3); Sept. 25 (2); Sept. 27 (several). Their destination was westward.

Trochilus colubris, Ruby-throated Hummingbird. Sept. 14 (1). Female or young.

Tyrannus tyrannus, Kingbird. In greatest numbers about Aug. 22. Numbers thinned by Aug. 28. Sept. 2 disclosed a family, and Sept. 4 a single bird.

Myiarchus crinitus, Crested Flycatcher. Sept. 14. A young bird noted in the timber. Not seen on the shore.

Sayornis phoebe, Phoebe. Sept. 1 (family); Sept. 2 (heard calling); Sept. 12 (2, old and young); Sept. 17 (1); Sept. 26 (1); Sept. 29 (heard).

Contopus virens, Wood Pewee. July 30, Aug. 22, Aug. 28, Sept. 1 (heard); Sept. 6 (heard); Sept. 11 (heard); Sept. 14, 17 and 18.

Empidonax minimus, Least Flycatcher. Aug. 28 (1).

Empidonax flaviventris, Yellow-bellied Flycatcher. Sept. 2 (2). These were noted in the timber back from the shore.

Otocoris alpestris praticola, Prairie Horned Lark. Horned larks bred in the adjoining fields, but migrants supposedly this species followed the shore regularly in small parties throughout October and November. Oct. 2 (10); Oct. 10 (numerous); Oct. 26 (flock); Oct. 30 (flock); Nov. 3 (flock); Nov. 6 (flock).

Corvus americanus, American Crow. Bred locally, but no flocks passed this way in migration. Sept. 23 (family); Sept. 29 (small party); Oct. 1 (4); Oct. 7, Oct. 17, Nov. 9 (2).

Cyanocitta cristata, Blue Jay. Observed back in the timber, but not on the shore.

Quiscalus quiscula aeneus, Bronzed Grackle. Bred locally. The flock of locals after gathering up to about fifty strong on July 20, left and was seen no more.

Scolecophagus carolinus, Rusty Blackbird. Sept. 30 (flock, males and females); Oct. 1 (flock); Oct. 4 (flock).

Agelaius phoeniceus, Red-winged Blackbird. July 22 (15); Sept. 1 (small party, males and females); Sept. 18 (12); Sept. 25 (small flock); Oct. 4 (flock). With the exception of the July flock, all the rest were migrants, like the other birds, headed westward.

Molothrus ater, Cowbird. This bird furnished surprises. Bred locally and during July the young were under observation almost daily. On July 31 a female and two young were noted after which the species disappeared entirely until Oct. 4, when a whole flock of males, females and young in company with Rusty Blackbirds, one morning surrounded the tower and spent an hour before moving off westward. A few more followed over the same course Oct. 6 and on Oct. 15 a male was noted.

Icterus galbula, Baltimore Oriole. Aug. 3 (2, young); Aug. 11 (male in song); Aug. 24, Aug. 30 (2); Sept. 1 (1); Sept. 2 (2). These birds probably were locals. On Aug. 24 two were seen to fly out over the lake a distance as though restless and ready to move; and their disappearance a week later followed.

Dolichonyx oryzivorus, Bobolink. Bred locally, but it was also one of the most interesting migrants. July 20 ("chinking" restlessly); July 22 (flock of fifty, only one faded male in evidence); Aug. 6 (two small flocks); Aug. 11 (30); Aug. 15 (flock);

Aug. 17 (flock); Aug. 22 (several flocks); Aug. 24 (several flocks); Aug. 26 (several flocks); Aug. 28 (flock); Aug. 31 (flock heard in the night, 10 o'clock); Sept. 2 (several flocks); Sept. 3 (flock); Sept. 7 (heard passing over). All these later flocks with the exception of one or two on Aug. 22, moved westward. They picked fair mornings and flew low. Usually they followed a course out over the water, aiming at the points on the shore and cutting the bays, and though they were often disconcerted by the aeroplanes, could not be shaken from their course. The height of their migration passed on Aug. 24. All these flocks were small, suggesting families, from five to eight being the rule. None were observed en route in the afternoon.

Sturnella magna, Meadowlark. Bred locally. Observed a small flock of about a dozen almost daily from Aug. 12 till Oct. 17. Only once (Oct. 6) did they show any evidence of migration, when a number of them flew off westward over the orchards as though in farewell.

Astragalinus tristis, American Goldfinch. Sept. 2 (several); Sept. 18 (common); Oct. 29 (five or six flocks heard); Nov. 16 (flock heard). It will be seen that this bird here was somewhat erratic. Only on Oct. 29 when several flocks passed overhead toward the west did it give a clue to its course.

Carpodacus purpureus, Purple Finch. This bird was never definitely identified though the clucking notes thought to belong to this species were heard Aug. 12, Sept. 2 and Oct. 6. A male, probably nesting, sang all summer in the ravine behind the main camp to southward.

Poescetes gramineus, Vesper Sparrow, Sept. 14, Sept. 26, Sept. 29 (4); Oct. 2 (1); Oct. 4 (1); Oct. 12. This was a common summer resident about the tower, but like the song sparrow gave no hint of its manner of leave-taking. It merely disappeared.

Passerculus sandwichensis savanna, Savanna Sparrow. Bred locally. Sept. 2 (1); Sept. 2 (in song); Sept. 8 (in song). This was the last definite record; there was mystery about this bird. What was probably his migration began Sept. 9. On the morning of this date fully fifty sparrows answering to the Savanna's markings, size and notes, came close by the tower. They took perch in the top of the walnut and locust trees and gave excellent view in the field-glasses. In threes and fours they broke away at short intervals and went dodging off westward, plainly on a mission. On Sept. 14 and Sept. 25 they repeated these field manœuvres. A single bird of the same was noted Sept. 28. To all appearances these were Savannas, but the trait did not seem to ring true.

Zonotrichia albicollis, White-throated Sparrow. Sept. 25 (heard); Oct. 4 (heard in song); Oct. 7 (several seen).

Spizella monticola, Tree Sparrow. Oct. 18 (1); Nov. 6 (5); Nov. 8 (several); Nov. 16 (flock of 12). Never observed en route; always in the shrubbery.

Passer domesticus, House Sparrow. During the late autumn several densely crowded small flocks of these adjustable gamins passed the tower. They were mostly west-bound and suggested a local migration.

Melospiza melodia, Song Sparrow. Perhaps the commonest bird of the locality. Very numerous during September, thinning out in mid-October. Observed also Oct. 31 and Nov. 6 (2).

Passerella iliaca, Fox Sparrow. Oct. 12 (1). Observed in the woods half a mile from the shore.

Junco hyemalis, Slate-colored Junco. Oct. 6 (several); Oct. 12 (numerous); Oct. 13, Oct. 14. As usual, these birds were not noted on the march; they merely came, increased and diminished.

Passerina nivalis, Snowflake. Oct. 15 (2); Oct. 29 (2 flocks); Nov. 3 (4 flocks); Nov. 5 (flock); Nov. 6 (6 flocks); Nov. 9 (flock); Nov. 10 (4); Nov. 16 (flock); Nov. 21 (large flock); Nov. 26 (flock). For the Snowflakes this shore seemed a direct pathway; they never on any occasion showed inclination to come down to the nearby fields.

Acanthis linaria, Redpoll. Oct. 18 (1); Oct. 19 (3); Oct. 20 (several); Oct. 29 (5 flocks); Oct. 30 (numerous); Nov. 3 (flock); Nov. 5 (flock); Nov. 6 (flock). These tiny sprites behaved like the Snowflakes, except that they invariably flew higher. Their chattering notes were the only means to identification.

Pipilo erythrophthalmus, Towhee. Bred locally. Observed in timber Sept. 14 (1); Sept. 29 (1); Oct. 7 (1). Not observed at all on the shore.

Calcarius lapponicus, Lapland Longspur. Noted only once (Nov. 9) when three went clicking overhead.

Petrochelidon lunifrons, Cliff Swallow. Aug. 5 (a few small parties); Sept. 8 (1); Sept. 19 (1)? It was rather hard to definitely identify the swallows as they posted by the tower on rapid wings. Several "doubtfuls" were recorded. The bird on Sept. 9 was with barn swallows and chimney swifts; the one noted Sept. 19 was alone. All were moving westward post-haste.

Hirundo erythrogaster, Barn Swallow. The commonest swallow here in migration. July 19 (family); July 22 (80 counted, passing a given point in 5 minutes, west-going); Aug. 10 (flock); Aug. 24 (2 families); Sept. 5 (1); Sept. 9 (12);

Sept. 12 (1); Oct. 4 (1).

Iridoprocne bicolor, Tree Swallow. Aug. 10 (1 young in a flock of barn swallows); Sept. 12 (3)?.

Riparia riparia, Bank Swallow. During the summer the commonest swallow species here; several colonies nested in the perpendicular clay banks. Latest appearances, Aug. 26 (2); Sept. 1 (2)?; Sept. 12 (5).

Progne subis, Purple Martin. Only one martin was seen on this shore. This was late in August; the date of appearance was neglected.

Ampelis cedrorum, Cedar Waxwing. In very large numbers along the shore by Aug. 10. The height of migration passed about Aug. 28, in small parties they moved off along the shore almost exactly as the bobolinks had done. They travelled low, seldom over two hundred feet. Later dates gave Sept. 4 (1); Sept. 5 (1); Sept. 7 (3); Sept. 10 (2); Sept. 11 (1).

Lanius ludovicianus migrans, Migrant Shrike. Bred locally. Old and young, the former with a fledgling house sparrow in its clutches, observed on the range by the tower Aug. 4. Not seen later.

Lanius borealis, Northern Shrike. Nov. 11. Shrike noted on a high perch in the field; doubtless this species.

Vireo olivaceus, Red-eyed Vireo. Aug. 15 (1); Sept. 2 (several); Sept. 8 (1); Sept. 14 (2); Sept. 24 (1); Sept. 29 (2).

Vireo flavifrons, Yellow-throated Vireo. Sept. 8 (1)?.

Mniotilta varia, Black and White Warbler. Sept. 8 (1). Observed in timber half a mile from shore.

Helminthophila peregrina, Tennessee Warbler. Sept. 2 (in song)?.

Dendroica tigrina, Cape May Warbler. Sept. 24 (1 male).

Dendroica aestiva, Yellow Warbler. Bred plentifully. Last young noted July 28. Aug. 6 (2); Aug. 11 (6); Aug. 22 (2). Neither this warbler nor any of the others were observed to make any bold flights. They merely darted from one cover to another.

Dendroica caerulescens, Black-throated Blue Warbler. Sept. 5 (adult male); Oct. 12 (adult male). The second bird was noted back from the shore in the timber.

Dendroica coronata, Myrtle Warbler. Sept. 23 (1); Sept. 25 (heard); Sept. 29 (7); Oct. 1 (1); Oct. 12 (numerous). Observed also Oct. 13, 15, 16 and 17. On Oct. 16 several of these fine warblers were in company with the bluebirds and as they worked below the tower there was a stiff contest between the two over the capture of a species of large insect prey coming from over the water. Often a bluebird and a warbler went after

the same victim. Seen from above it was a beautiful picture indeed.

Dendroica maculosa, Magnolia Warbler. Sept. 6, Sept. 14 (family); Sept. 24 (adult male).

Dendroica striata, Black-poll Warbler. The warbler most commonly observed on the shore. Sept. 5, 6, 15, 17. Sept. 19 (2); Sept. 23 (1); Sept. 24 (2); Sept. 25 (2).

Dendroica virens, Black-throated Green Warbler. Oct. 13 (1); Oct. 14 (1). Neither of these birds were on the shore; both were back in the timber.

Geothlypis trichas brachidactyla, Northern Yellow-throat. Aug. 29 (1); Sept. 17 (1). The first was an adult; the second young.

Wilsonia canadensis, Canadian Warbler. Sept. 8 (family). These were observed back in the woods.

Setophaga ruticilla, American Redstart. Sept. 2 (young).

Anthus pensylvanicus, American Pipit. Sept. 13 (3); Sept. 23 (1); Oct. 31 (several). All these birds went by westward above the tower and showed no inclination to stop here.

Troglodytes aedon, House Wren. Sept. 25 (1).

Olbiorchilus hiemalis, Winter Wren. Oct. 7 (heard)?; Oct. 13 (1); Oct. 14 (1). All these birds were in the woods back from the shore.

Toxostoma rufum, Brown Thrasher. Bred locally, but not observed near the shore.

Galeoscoptes carolinensis, Catbird. Aug. 9 (2); Aug. 11 (1).

Sitta canadensis, Red-breasted Nuthatch. Sept. 2 (2); Sept. 8 (2); Oct. 4 (1). The September birds were noted in the timber to southward.

Sitta carolinensis, White-breasted Nuthatch. Oct. 6 (1); Oct. 17, Oct. 31, Nov. 11 (1); Nov. 6 (1). This species followed the shore more closely than the preceding.

Parus atricapillus, Black-capped Chickadee. Sept. 14 (2); Sept. 24 (family); Nov. 1 (numerous); Nov. 6, 7, 11, 26. These little sprites were most numerous during the first week in November. They plainly were working westward. On Nov. 1, during a strong south-westerly wind, four were observed to spring up from a nearby walnut and fight it out with the wind for several minutes. They made two or three trials and then gave it up. They were more numerous at this time than circumstances other than migration could warrant.

Regulus satrapa, Golden-crowned Kinglet. Oct. 12, 13, 14, 30 and Nov. 7. On the last two dates only, the birds were in the apple trees along shore. The earlier records were back in the timber. These birds were always in small companies.

Regulus calendula, Ruby-crowned Kinglet. Oct.

1 (1); Oct. 4 (1); Oct. 6 (3); Oct. 7 (4); Oct. 14 (2). With the exception of the last record when both species were found in company back in the woods, all the ruby-crowns were noted in the orchard below the tower.

Hylocichla aliciae, Grey-cheeked Thrush. Oct. 7 (1)?.

Hylocichla ustulata swainsoni, Olive-backed Thrush. Sept. 2 (several); Sept. 8, Oct. 7 (20); Oct. 12 (50); Oct. 13 (3). Not one bird of these numbers was observed at the tower; all clung to the woods to southward. Owing to the extreme difficulty in distinguishing the grey-cheek from the olive-back in the field, it is possible that numbers of the former may have been overlooked.

Hylocichla guttata pallasii, Hermit Thrush. Oct. 11 (1). On this date a thrush with a reddish tail was observed for a few moments almost directly

below the tower. It was doubtless a hermit. Not seen elsewhere.

Merula migratoria, Robin. Sept. 2 (several); Sept. 7 and 8 and Oct. 4, heard in song; Oct. 13 (12); Oct. 18 (3); Oct. 31 (1); Nov. 1 (small flock).

Sialia sialis, Bluebird. Sept. (family); Sept. 14 (family); Sept. 29 (family); Oct. 4 (flock of 30); Oct. 6 (several); Oct. 8 (flock); Oct. 9 (several); Oct. 16 (several); Oct. 17 (several); Oct. 18 (several). The September records probably were all local birds; they were seen remote from the tower. But on Oct. 4 the birds were en route westward. They stormed into the locusts nearby—a beautiful blue blizzard—and after a short council they swirled away again over the orchards. On Oct. 8 a large flock went over without stopping to pay their respects. The later birds were in small numbers and taking their time.

THE FLORA OF WARRENS LANDING, LAKE WINNIPEG, MAN.

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Warrens Landing is at the extreme north of Lake Winnipeg and at the source of the Nelson river which carries all the waters of the lake to the Hudson Bay. It is north of the fifty-second parallel and is, therefore, in that territory which has been recently added to the Province of Manitoba.

The source of the Nelson river is about $2\frac{1}{2}$ miles wide and is almost blocked by an island which is nearly 2 miles across with approximately 8 miles of coast line. The eastern channel is narrow and comparatively little water flows through it. The western channel is the important one. Here, the only signs or marks of civilization are four light-houses, two on the mainland and two on the island, and two fishing stations, one on the mainland and one on the island. It was during a visit on the first eleven days in August, 1918, to the fishing station on the island that I made the observations recorded here.

Travelling northwards up Lake Winnipeg one cannot help noticing a number of natural features and I think the most conspicuous is the difference between the eastern and western shores. The eastern shore is strewn with large red rocks of Laurentian granite, whilst the western shore is littered with grey Cambro-Silurian limestone boulders. This feature is alone sufficient to make a study of the flora surrounding the lake of great interest. On the eastern side many species typical of Ontario reach their western limits and on the western shore are

found the first of many prairie forms not found in the east.

Another conspicuous feature travelling northwards is the gradual ascendancy of coniferous trees over the deciduous ones. The coniferous trees are not frequent at the southern end of the lake and the deciduous trees are comparatively few around the northern shores. The prevailing conifer is the white spruce, *Picea alba*, in the more southern parts, and the bog spruce, *Picea mariana*, in the swampy regions of the north. The deciduous trees in the northern parts around the lake are comparatively small and restricted to poplars, willows, and a few birches.

The island at Warrens Landing is practically all muskeg. It appears to be, for the greater part a deposit of mud on the top of granite and covered with from one to two feet of *Sphagnum*. Only in a few places is the rocky substratum exposed. It is thickly treed with the bog spruce. The shore on the south and west is littered with uprooted trees and shrubs. This is the result of rapid coast erosion and is due to the violence of lake storms, the strong and fast current carrying great masses of ice through the very shallow and comparatively narrow channel, and to heavy rain storms. During the eleven days I was there it rained every day and nearly every night and caused frequent landslides along the shore. Water slowly soaking through the *Sphagnum* washes out the loose muddy soil underneath and when a

heavy fall of rain saturates this peaty moss the weight is too great for it to remain in position and it breaks away and slides down to the water's edge.

The dominant feature of the island is the bog spruce, *Picea mariana*. It is by far the commonest and largest tree on the island. Near the shore in a few places the poplars are plentiful, but elsewhere they are scarce, the two species *Populus tremuloides* and *P. balsamifera* are evenly distributed. *Larix laricina* is not infrequent among the spruce.

The interest of the small sandy portion of the island centres on the variety of willows of which there are seven species, some of them being typically northern ones, as *Salix candida* and *S. argyrocarpa*. *Mertensia paniculata* is frequent here. The following beach plants are also restricted to this area, *Lathyrus maritimus*, *L. palustris*, *Artemisia caudata*, and *Juncus balticus* var. *littoralis*.

Two plants usually found in limestone regions, *Rhinanthus Kyrollae* and *Primula mistassinica*, are found on a small mud flat which has been thrown

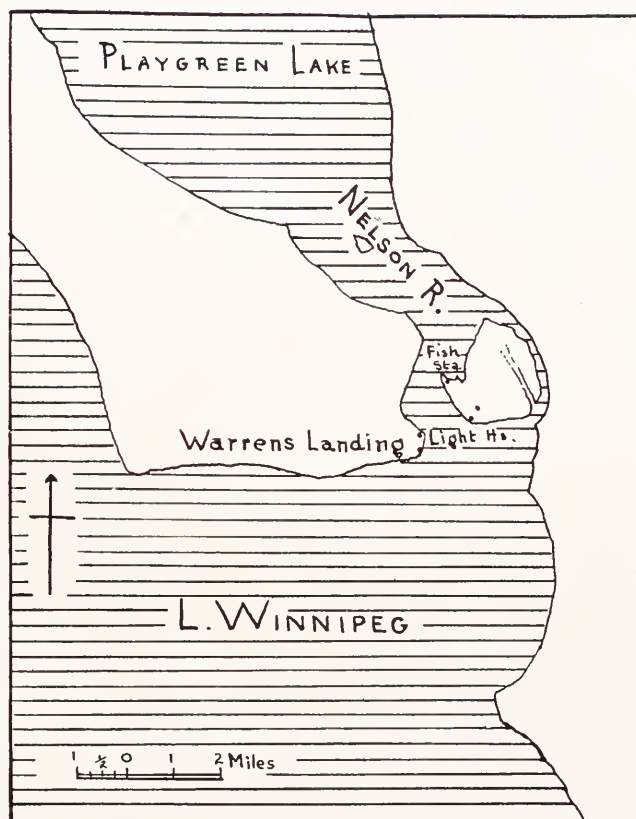


Fig. 1. Map showing the source of the Nelson river and the island in the source of Warrens Landing.

A dense shrubbery undergrowth prevails throughout the greater part of the island and the Labrador tea, *Ledum groenlandicum*, is the most prevalent. Other shrubs less numerous although fairly plentiful are *Kalmia polifolia*, *Chamaedaphne calyculata*; and *Viburnum pauciflorum*.

Under the shrubs many species, typical of northern regions, are found in large numbers. These include *Rubus arcticus*, *Rubus chamaemorus*, *Ranunculus lapponicus*, *Petasites trigonophyllus*, and *Stellaria longipes* var. *lacta*.

up by lake storms and is rich in fragments of broken calcareous shells.

Owing to the heavy and frequent rains many plants were found submerged. One patch of *Drosera rotundifolia*, was in from six to eight inches of water, nearly every plant was in flower and every flower was two inches or more above the water.

In the following list of species the arrangement and nomenclature is as far as possible that used in the seventh edition of Gray's Manual of Botany.

LIST OF PLANTS FOUND AT WARRENS LANDING
ISLAND, LAKE WINNIPEG, MANITOBA.

EQUISETACEAE

- Equisetum arvense* L.
fluviale L.
sylvaticum L.

PINACEAE

- Juniperus communis* L. var. *depressa* Pursh.
horizontalis Moench.
Larix laricina (Du Roi) Koch.
Picea mariana (Mill.) B.S.P.

TYPHACEAE

- Typha latifolia* L.

NAJADACEAE

- Potamogeton interior* Rydb.
Richardsonii (Benn.) Rydb.

- Carex Bebbii** Olney.
*brunnescens** Poir.
*retrota** Schewin.
*utriculata** Boott.
*viridula** Michx.
Eleocharis acicularis (L.) R. & S.
palustris (L.) R. & S.

- Eriophorum callitrix* Cham.
Scirpus microcarpus Presl.*
validus Vahl.*

LEMMACEAE

- Lemna minor* L.

JUNCACEAE

- Juncus balticus* Willd. var. *littoralis* Engelm.
*bufonius** L.
*Richardsonianus** Schutt.



Fig. 2. Part of the shore of the island at Warrens Landing, showing the effect of coast erosion. The trees are *Picea mariana*, *Populus balsamifera* and *P. tremuloides*. In the foreground on the left is *Eleocharis palustris*.

ALISMACEAE

- Alisma Plantago-aquatica* L.
Sagittaria latifolia Willd.

GRAMINEAE

- Agropyron tenerum* Vasey.
Alopecurus pratensis L.
Beckmannia erucaeformis (L.) Host.
*Deschampsia caespitosa** (L.) Beauv.
*Elymus macounii** Vasey.
Hordeum jubatum L.
*Panicularia grandis** (S. Wats.) Mash.
*Phalaris arundinacea** L.

CYPERACEAE

- Carex atherodes** Spreng.
*aquatilis** Wahlenb.
aurea Nutt.

LILIACEAE

- Smilacina trifolia* (L.) Desf.

IRIDACEAE

- Sisyrinchium angustifolium* Miller.

ORCHIDACEAE

- Habenaria hyperborea* (L.) R. Br.

SALICAEAE

- Populus balsamifera* L.
tremuloides Michx.
Salix argyrocarpa Anders.
candida Flügge.
discolor Muhl.
longifolia Muhl.
lucida Muhl.

Plants marked with * were sent to Dr. M. O. Malte, Ottawa, for identification and confirmation.

Salix pellita Anders.
rostrata Richards.

URTICACEAE

Urtica gracilis Ait.

POLYGONACEAE

Polygonum aviculare L.
Convolvulus L.
Persicaria L.
Rumex mexicanus Meism.

CHENOPODIACEAE

Chenopodium album L.

CARYOPHYLLACEAE

Arenaria lateriflora L.
Stellaria longifolia Muhl.
longipes Goldie var. *lacta* (Richards)
Wats.

RANUNCULACEAE

Actaea alba (L.) Mill.
rubra (Ait.) Willd.
Anemone canadensis L.
Ranunculus abortivus L.
Cymbalaria Pursh. var. *alpinus* Hock.
aquatilis L. var. *capillaceous* D.C.
Flammula L. var. *reptans* (L.) Mey.
lapponicus L.
pennsylvanicus L. f.
scleratus L.

CRUCIFERAE

Arabis Drummondii Gray.
Brassica arvensis (L.) Kütz.
Capsella Bursa-pastoris (L.) Medic.
Erysimum cheiranthoides L.
Lepidium apetalum Willd.
Radicula palustris (L.) Moench.
Sisymbrium incisum Engelm.

DROSERACEAE

Drosera rotundifolia L.

SAXIFRAGACEAE

Mitella nuda L.
Parnassia palustris L.
Ribes oxycanthoides L.
prostratum L'Her.

ROSACEAE

Fragaria virginiana Duchesne.
Ceum strictum Ait.
Potentilla Anserina L.
monspeliensis L.
palustris L.
Rosa acicularis Lindl.
Rubus arcticus L.
Chamaemorus L.
idaeus L. var. *aculeatissimus* (Mey)
R. & T.
triflorus Richards.

LEGUMINOSAE

Astragalus canadensis L.

Lathyrus maritimus (L.) Bigel.
palustris L.

Vicia americana Muhl.

GERANIACEAE

Geranium Bicknellii Britton.

VIOLACEAE

Viola nephrophylla Greene.

ELAEAGNACEAE

Elaeagnus argentea Pursh.

ONAGRACEAE

Epilobium adenocaulon Haussk.
angustifolium L.

HALORAGIDACEAE

Hippuris vulgaris L.

ARALIACEAE

Aralia hispida Vent.

UMBELLIFERAE

Carum Carvi L.
Heracleum lanatum Michx.
Sanicula marilandica L.
Sium cicutaefolium Schrank.

CORNACEAE

Cornus canadensis L.
stolonifera Michx.

ERICACEAE

Arctostaphylos uva-ursi (L.) Spreng.
Chamaedaphne calyculata (L.) Moench.
Chiogenes hispidula (L.) T. & G.
Kalmia polifolia Wang.
Ledum groenlandicum Oeder.
Pyrola asarifolia Michx.
secunda L.
Vaccinium Oxycoccus L.

PRIMULACEAE

Dodecatheon Meadia L.
Primula mistassinica Michx.
Trientalis americana (Pers.) Pursh.

GENTIANACEAE

Gentiana Amarella L. var. *acuta* (Michx.)
Horder.

BORAGINACEAE

Mertensia paniculata (Ait.) G. Don.

LABIATAE

Mentha arvensis L. var. *canadensis* (L.)
Briquet.
Stachys palustris L.
tenuifolia Willd. var. *aspera* (Michx.)
Fernald.

SCROPHULARIACEAE

Rhinanthus Kyrrollae Chabert.
Veronica serpyllifolia L.

PLANTAGINACEAE

Plantago major L.

RUBIACEAE

Galium triflorum Michx.

CAPRIFOLIACEAE

Linnæa borealis L. var. *americana* (Forbes)
Rehder.

Viburnum pauciflorum Raf.

CAMPANULACEAE

Campanula rotundifolia L.

LOBELIACEAE

Lobelia spicata Lam. var. *hirtella* Gray.

COMPOSITAE

Artemisia caudata Michx.

Bidens cernua L.

Erigeron philadelphicus L.

Petasites sagittatus (Pursh) Gray.
trigonophyllus Greene.

Solidago multiradiata Ait.

Taraxacum officinale Weber.

CANADIAN SPHAERIIDAE.

BY THE HON. MR. JUSTICE LATCHFORD.

(Continued from Vol. XXXIII, page 86)

2. *SPHAERIUM CRASSUM* Sterki. This species was described in 1901 from shells procured in Northern Michigan. In Ontario it has so far been found in but one locality—an artificial water-course, made about twenty-five years ago to intersect the flow of Cave creek across Holland Avenue, and divert it directly northward to a new outlet above the Little Chaudiere rapids. The members of the Club are now regrettably few who can recall the time when this stream disappeared into a rocky cave or fissure in Hintonburg, south of the Richmond road, and saw light again only when near the foot of Lazy Snye—*le Chenal Paresseux* of the rivermen—a locality prolific in molluscs in those remote days, though now foul and virtually barren.

A few immature shells, collected long ago in Cave creek, on the Stewart and Hinton farms, when it contained a large volume of water, which were thought to be *S. sulcatum*, were probably *S. crassum*. But the very metropolis of the species was not discovered until many years later. It was—not is, I regret to say—in the deepest part of the cutting through the Black river limestone, north of the Canadian Pacific Railway, in the line of Holland Avenue produced. There was at the time about a foot of clear water at the bottom of the trench, flowing freely over a few inches of small pieces of rock—in many cases fragments of cephalopods, corals and brachiopods that had flourished and perished on the shores of a torrid sea in the inconceivably remote era when this limestone was in process of formation. Among these relics of primaeval faunas the new species was unexpectedly found in great numbers and beautiful form. Dr. Walker has courteously afforded me an opportunity of examining specimens of the type lot from Michigan. Our shells are larger and more robust, but appear to be identical in many of their aspects.

It is fortunate that an extensive series was secured during the season when *S. crassum* was first ob-

served, as more recent visits to the locality proved absolutely fruitless. The new intercepting system of drainage along Wellington Street had cut off the flow of water from the south, and large blocks of stone fallen from the banks had clogged the cutting so that little water flowed through it. Of this rare and remarkable species not even a "bone"—as a mere value or empty shell is called—could be found, though many of *Lymnaea palustris* (a pond snail that ranges deeply over three continents) and of a large form of *Planorbis trivolvus* were noticed. However, on passing out of the cutting, and reaching a muddy pool in the stretch extending directly southward to the railway, a few good specimens of *S. crassum* were procured. This locality was still producing sparingly in August, 1919. For a few more years it will doubtless afford opportunities for collecting this fine shell, and then, like the ponds which once existed near Gladstone Avenue and St. Louis' Dam, be swallowed by the insatiable city.

S. crassum, when mature, is easily distinguished from *S. sulcatum*, especially when large number of the two species are placed side by side. To state the precise differences briefly and without the use of many technical words is difficult. Perhaps it will suffice to say that *crassum* as found near Ottawa, is less elongated than *sulcatum*, more inflated and heavier; the umbones are larger and rounder, and the beaks more closely approximate. The striae are deeper, and the rest bands are less distinct; the general colour, a deep ashy grey, is much more uniform.

This fine *Sphaerium* probably occurs in other places in Ontario. I have a few shells in poor condition from Masham which may be *crassum*. It is said by Dr. Sterki to have been found in Quebec, and New York, but the localities are not given.⁶

3. *SPHAERIUM AUREUM* Prime was described in 1851 from specimens probably found by Prof.

⁶Ann. Carneg. Mus. Vol. X (1916) p. 432.

Agassiz on the expedition to Lake Superior. It is supposed to be identical with a *Sphaerium* now found in the Upper Mississippi Valley, in Illinois, Iowa, South Dakota, and as far east as North-western Ohio. Such shells are generally light to dark corneous or greyish. As it occurs near Ottawa it conforms more closely to Prime's description, and is "bright golden" or "greenish-yellow." Like *S. crassum* it has been found here in but one station—Moore's Creek in Hull. It is not a common shell, but is least rare in a pool about a hundred yards north of the Aylmer Road, near the abrupt turn of the stream southward, after a short westerly course. It is smaller than *S. sulcatum*, and larger than the recently described *S. torsum*, which are found associated with it in Moore's Creek.

A single representative of each of the three genera of *Unionidae* found in Canada occurs in the same stream—*Unio compressus* Lea, *Margaritana undulata* Say, and *Anodonta ferussaciana*, var. *subcylindracea* Lea—the latter being the only anodon occurring also in the creeks at Stittville and Britannia Highlands.

Mr. C. W. Johnson of the Boston Society of Natural History, has compared specimens of *S. aureum* from Hull with shells believed to be Prime's types, and is satisfied of the correctness of the identification, which Dr. Sterki confirms.

A single shell, shorter and much more inflated—almost spherical in fact—from Moore's creek, is doubtfully referable to this species. It might be regarded as merely abnormal if another shell, identical in size and shape, had not been found in the outlet of Meach Lake. If additional specimens should be found, the shell may be entitled to specific rank.

4. *SPHAERIUM FLAVUM* Prime is another of the shells described from specimens found on the Agassiz Expedition, and was described as from Sault Ste. Marie. Dr. Sterki states its habitat to be "the region of the Great Lakes." Whiteaves⁷ records it as collected by Mr. McInnis in the Root and English rivers, near Lac Seul, in north-western Ontario.

My first specimens were imperfect separate valves obtained in the early eighties in the mill pond of Pattee & Perley, at the Chaudiere, which happened at the time to be empty. They were sent for identification to Tryon of the Philadelphia Academy, who marked them "*S. striatinum*?" It was not until long afterward, one day in late summer, when the river was very low, that the shell was found living about a mile higher up the Ottawa. I was picking my steps along the remains of the dam that once led a portion of the waters of the Little Chaudiere to the

pioneer mills of Nicholas Sparks.⁸ As the crib work of the dam decayed the filling of stones and gravel was in places pressed outwards into the rapids. In the centre of a runnel in one of the breaches so formed I observed what seemed like a number of golden beads. Closer inspection proved the attractive little objects to be bright yellow sphaeriums unlike any form of *striatinum* known to me. Large numbers were collected in this and other similar places along the dam, and good sets distributed among my correspondents. The shell was so uniformly regarded as *S. flavum* of Prime that I have little doubt of the correctness of the identification.

Although the dam has since been swept completely away, the shell is, I am sure, still to be found in the depressions in the rapids where eddies form and fragments of rock accumulate. However the current is usually so strong that wading would be seldom unattended with danger. One locality for this species is accessible without risk when the river is low. It is in the old mill race itself. Along the shore line, and from fifty to a hundred feet above the dead water in the "Snye," lies a narrow talus, covered in late summer with not more than a few inches of water. On moving the larger stones and raking among the smaller ones, many specimens of this shell may be easily found.

S. flavum is smaller than any of the shells previously mentioned. At Ottawa it rarely exceeds 10 mm. in length. Its color is brighter than that of any of our sphaeriums except the much larger *S. aureum* and certain of the less inflated *S. occidentale*. As no other shell of the family has been observed in

⁷It may be of interest to note that Captain Le Breton's mills at Britannia were of a still earlier date. They were begun in 1818 to serve the military settlements established in that year at Richmond and March, and were the first built on the Upper Canada shore of the Grand river (as the old name of the Ottawa was then commonly abbreviated) above the Long Sault, where Hawkesbury now is. Robert Randall's ambitious projects to develop water power and establish mills and iron works to smelt the Hull ores on his four hundred acre property, purchased in 1809, and extending (in present-day nomenclature) from Bronson avenue to Booth avenue and from Carling avenue to the Ottawa (but not including the islands), were frustrated by the persecution to which he was subjected by members of the Family Compact, his seven years' imprisonment at Montreal, and the scheme devised and successfully carried out by Le Breton and Levis Peters Sherwood, assisted by Sherwood's brothers-in-law, John Stuart and Henry John Boulton, by which Stuart, as sheriff of Brockville, at the instance of Boulton, and without notice to Randall, for whom Boulton had acted as counsel, sold to Le Breton on December 11, 1820, all Randall's lands in what is now the heart of Ottawa. On the next day the captain, as no doubt in duty bound, conveyed an undivided half-interest in the property to Sherwood. The story of this nefarious transaction, which was held nevertheless by a judicial member of the Compact to be within the law, is told at length in Appendix (S.S.S.S.) to the Journals of the Legislative Assembly of Upper Canada for 1853.

The destruction of Sparks' mills is among the faintest of early memories. Of these mills—as of Troy—it may be truly said that even the ruins have perished.

⁸Report Bureau of Mines, 1912, p. 138.

the Little Chaudiere rapids, at least along the Ontario shore, any bright little bivalve found there may safely be designated *S. flavum*.

5. *SPHAERIUM RHOMBOIDEUM* Say is a shell of great beauty and very wide distribution, its range extending from the New England States to Alaska. The most northerly locality recorded for this province is Albany river, where it was collected by Mr. McInnes.

The specific name, like many of the names applied by the famous naturalist who described it, expresses the most striking characteristic of the species. Certain other sphaeria are rhomboidal in lateral outline; but none appears so obviously to have that form. Other features renders this species readily distinguishable. The epidermis is highly polished, usually dark olive in color, with lighter bands and an outer yellow zone. In a few localities, however, it is of a uniform deep brown. This is especially a marked feature of the shells from the pond on Duck Island, and, to a less extent, of those from the pond on the Metropolitan Electric Company's property at Britannia. Iron in the water may have brought about this effect. No other cause can in my opinion be suggested for the brown color—not only external but incorporated in the substance of the shell of the lymnaeidae which swarm in the bay, opposite the Rideau falls, into which Leamy lake discharges—"the Rafting Ground" of other times, where the huge sticks of white pine, made in the *chantiers* of the Wrights, McGoeyes, and Hamiltons, were after their perilous drive down the chutes and cataracts of the Gatineau, formed into cribs and rafts in the spacious days of the square timber trade. Either from rusted chains, iron implements long lost in the bay, or from leachings from the mines and furnaces once operated a few miles to the north, every shell there acquires a coat of brown mail, and many become dwarfed in growth. *Planorbis antrorsus* has not a tenth of the volume of shells of the same species found among the nearby hills; and *Pl. campanulatus* is even smaller than the depauperate form from the marl beds at Hemlock Lake. *S. rhomboideum*, as it occurs not in the bay, but in the canal leading into it from Leamy lake, is not seriously affected, though browner than any found elsewhere except at Britannia and on Duck island.

This species was once very common in the ponds north of St. Louis' Dam, and is doubtless still to be found in Dow's lake, south of it. Farther to the south it occurs in the outlet of Dow's swamp. To the east it is found in Hemlock lake, but not in large numbers. The most easily accessible and productive locality for it is the creek in Britannia Highlands, at the Bridge on Tavistock Road. It may, however, be met with in almost any stream or pond on the Ontario side of the Ottawa. In the clearer waters of

the Laurentian hills it seems to occur but rarely. One specimen has been found in Meach lake, and none elsewhere on the Quebec side. An adult shell of average size measures 13x10x9 mm. Young shells are proportionably less inflated.

6. *SPHAERIUM OCCIDENTALE* Prime. This is one of our commonest species. It may be found in almost any marsh, or any depression in our deciduous woods where water lies at intervals. Many of the sphaeriidae are capable of enduring long periods of dessication—more apparent at times than real, as some moisture will on careful investigation be often seen to be present; but this species can seal up its activities and lie dormant for weeks or months in the driest situations. Of course all molluscs living in our marshes, and shallow creeks, and ponds, are frozen stiff as icicles every winter; but except in winter comparatively few can remain long alive without water or at least moisture. *S. occidentale* can better endure a long period of absolute drought, such as sometimes prevails in Ontario, especially in recent years, than any of the genus. None of our large bivalves seems capable of enduring dessication for more than a few days or at most a week; though certain Florida kinds have been found alive by Charles T. Simpson in stations which had long been as dry as dust.

In the woods in the Eastern part of the City, near Beechwood cemetery, every hollow contains this *Sphaerium* and no other. In midsummer it may be found in such places by raking the surface of the mould. It is usually bright yellow, oval in outline, but slightly inflated, and seldom exceeds 8 mm. in length. A much paler form occurs on Lemieux island, south of the new pumping station. It is a clear Naples yellow in color, but does not vary from the normal in any other respect. At Britannia where *S. occidentale* exists in great numbers in the marsh in Loma Park, near the Magee farm, and, on that farm, north of the railway lines, in a hollow under large willows directly north of Britannia Highlands station—a locality singularly prolific in many desirable shells—it is smoky grey in color. West of the village it may be found inside the railway culvert. In these and other stations it is accompanied by several members of the family, and the beginner would do well to procure first the shells of McKay's bush or Lemieux island before resorting to places where several sphaeriums and musculiums are also found.

Under an inch objective this shell will be noticed to be covered with numerous small papillae. This feature has not been observed in any of our other species, and may serve as a means of identifying *occidentale*. Once however the characteristics of the species are carefully observed, confusion with any other known to occur near Ottawa is unlikely.

S. occidentale does not extend as far to the north as *S. rhomboideum*. It ranges however in a belt of irregular width from Quebec and the Eastern States to California and British Columbia.

7. *SPHAERIUM TORSUM* Sterki was described from shells collected in Moore's Creek in the same station that affords *S. aureum*. I have not found it elsewhere. Dr. Sterki may, however, have specimens among shells sent to him from the Rideau. If so the fact escaped my notice. By his permission—one of many sets of kindness—I append his description:—

Sphaerium torsum sp. nov.

Mussel inequiptartite, oblique, well-inflated, posterior part higher, and much more voluminous than the anterior; dorso-ventral axis curved and oblique; beaks strongly inclined forward, large, prominent, rounded, not or slightly, mamillar, superior margin curved, not, or barely, bounded by angles; scutum and scutellum well marked; anterior and posterior ends rounded, inferior margin moderately curved; surface with fine, slight, irregular or subregular concentric striae and a few lines of growth, shining; yellow, straw colored in younger specimens; shell moderately strong, hinge long for the shape and size of the mussel, almost regularly curved, rather slight; cardinal teeth small, the left posterior tooth vestigial in some specimens; laminae rather slight, at almost right angles to each other; ligament covered, resilium moderately strong. Soft parts not examined. Long. 11 mm.; alt. 9 mm.; diam. 7 mm. (100: 83:64).

S. torsum appears to range near *emarginatum* of the same region, but is more oblique, of more rounded outlines, more evenly inflated. The beaks are less elevated, less mamillar, and more inclined forward, and the hinge is much slighter.

Habitat.—Quebec, Ontario, along the Ottawa River near Hull and Ottawa, collected by Justice Latchford. No. 6956 for full-grown, and 7286 for young and adolescent specimens. It occurs also in Wisconsin.

Fossil.—Goat Island, Niagara, collected by Miss J. E. Lotson, 1900, (No. 2224a).

8. *SPHAERIUM EMARGINATUM* Prime ranges from Maine to Lake Superior and Winnipeg, and northwest to the District of Patricia, where it was found by Mr. McInnes in the Attawapiscat river. Mr. James H. Ferris found it in great numbers in the Montreal river, north of Sault St. Marie, and has kindly sent me specimens from that locality.

In the vicinity of Ottawa this species has been found only in the canal, above Hartwell's locks, and in the outlet of Phillip's lake, in the County of Pontiac. Its resemblance to *torsum* is indicated in the description of that species. The Ottawa shells are slightly more inflated, the average size from the canal being 10.2 x 8 x 7 mm.

9. *SPHAERIUM STAMINEUM* Conrad does not seem to be a common shell in or near Ottawa, where I have not found it elsewhere than in the Rideau opposite Strathcona Park. In Toronto it abounds in the Don and Humber. The beautiful little Lynn between Simcoe and Port Ryerse, in the County of Norfolk, also affords it in great numbers.

A shell doubtfully considered *stamineum*, but which may be an undescribed species, occurs in the outlet of Swan lake in Pontiac. Unfortunately only a few could be procured.

S. stamineum is approximately triangular in outline and of a uniform yellow color. The name applied to it by Conrad (meaning *thready* or *fibrous*) does not refer to any of its characteristics. Probably *stramineum* (=straw) was the term intended, as that is the prevailing color of the species; but as the specific name applied has some meaning it must stand for all time. Toronto shells average 13.5 x 10 x 9.7 m.m.

10. *SPHAERIUM ACUMINATUM* Prime. A mussel believed to be this species is very common in Lake Des Chenes, especially above the pier at Britannia and in Graham Bay. Prime at one time at least regarded *acuminatum* as a synonym of *striatinum*; but no form of the latter species that I have ever seen approaches in appearances the Des Chenes shell when mature, though young shells are not unlike young *striatinum*.

In midsummer dead shells may be occasionally noticed washed up along the railway embankment at the southerly end of the bay. Later, when the river is in its lowest state, thousands of this species rise from their drying beds all over the exposed flats, and plough along the surface their slow way—devious at times but in the main direct—towards the receding water. This manifestation of the instinct of self preservation is common to all mussels, large and small, in similar condition; but I know of no place in which it is more plainly exhibited than in Graham bay. The furrows end in a deeper depression when the animal is exhausted or has reached a location sufficiently moist. The number of specimens that one can collect is limited only by the time at one's disposal. Children learn quickly where the shells are to be found, and delight in picking them up and rendering aid to the naturalist who desires a large series of specimens. Identification is rendered easy owing to the fact that no other *Sphaerium* has been found in the bay. Many *pisidia* however occur there—of which more hereafter; and south of the railway, in the marsh, connected at high water with the bay through a culvert, several species of our three genera of sphaeridae are to be found in early summer.

Eighty or ninety shells found on June 21, 1916, between little islets, near the shore, about five hun-

dred yards west of the pier at North Bay in Lake Nipissing, while similar to *acuminatum* not fully matured, appear to be a different species. If so, they have not been described. Additional material in quantity, collected later in the season, would probably remove all doubt; but an effort to obtain it on the occasion of a subsequent visit failed owing to the height of the water and the absence of proper facilities for dredging. The ten largest shells found average 8.78×7 , 15×5.13 mm. or 100: 81.5: 58.5.

The average size of ten full grown shells found at Britannia is $12.1 \times 10 \times 7.5$ mm. or 100:82.5: 61.5. Four miles up the lake, in Shirley's Bay, the shell is slightly smaller. The species occurs sparsely along New Orchard Beach.

11. *SPHAERIUM STRIATINUM* LAMARCK was described in 1818 from specimens believed to have been collected in Lake George, New York. The types are, I presume, preserved in the Jardin des Plantes. The type locality lies in a region where there are few collectors, even among those who, like the writer, occasionally visit its lovely shores. My few opportunities have been restricted to the south or upper end of the lake, and were absolutely fruitless. The shell doubtless occurs in one or more of the bays along the east shore, or at the outlet, near historic Ticonderoga.

The desirability of obtaining shells from the locality which furnished the type chiefly arises from the brevity of the original description and the difficulty of determining what shell it was applied to.

Lincoln had in his law office a drawer labelled "If you can't find it anywhere else, look here." Similarly *striatum* is a species to which any medium sized shell of the genus may be assigned. Dr. Sterki states (Am. Carneg. Mus. Vol. X, p. 437) that almost every *Sphaerium* has been named "*striatinum*."

Mussels believed to be of that species abound on the sandy shoals along the northerly shore of Duck Island. They are so numerous that sometimes in August and September they form a distinct line where washed up by the waves from passing boats, and are preyed upon by plover and other wading birds. Ten adult shells average $11.2 \times 8.3 \times 5.6$ mm., or 100: 74:50. No *Sphaerium* but this has been observed along the upper beaches of the island, unless a shorter and less inflated shell which is but occasionally met with shall prove distinct.

Striatinum has been found in the canal at Cornwall. Shells from that locality more nearly resemble specimens attributed to this species received from various points in the United States than do the Duck Island shells. It occurred among shells collected at Toronto, in the bay east of the mouth of the Humber, a locality now destroyed by harbor improvements, which afforded me the only specimens of the European *Valvata piscinalis* L. discovered on this continent. In passing it may be mentioned that another importation, *Bithynia tentaculata* L., abounds in Toronto Bay, and in the canal at Cornwall.

(To be continued.)

BELATED GUESTS.

BY FRANK MORRIS, PETERBOROUGH, ONT.

In the last week of December, while working on examination papers, I took an occasional tramp with a colleague through the countryside about the city of Peterborough, Ont. We were both armed with field-glasses and got more than the usual run of luck in observations.

On one occasion, west of the city, we sighted a flock of small birds at work among the coarse stalks of pigweed and other plants in a wayside field. The quickness of the birds' movements and the curious unanimity of the whole flock, as it forged hurriedly ahead to a fresh clump of seed spikes, or rose in swirling flight through the air, now warping half across the field, to settle suddenly down, as by a single impulse, at some unexpected point—all this made endless entertainment to watch, even though the bleak wind drew the rheum from one's eyes. On closer view the flock proved to be made

up of goldfinches in their sober garb of winter with a sprinkling of snowbirds.

East of the city, again, on Dec. 28th, from the middle of a field beside us, there suddenly rose just such another flock of small birds, for all the world like a flutter of leaves caught up by a random gust and swept through the air; along they came, warping this way and that, now rising, now falling; and suddenly wheeling downwards in mid-air, dropped into a row of elm saplings right beside us. The numerous faint twitterings heard in flight were replaced by one or two, single, clear, deliciously sweet canary notes of *twée-ée, twée-ée*, from some leader of the band. "Goldfinches," I exclaimed; but my companion, more alert with his glasses, soon detected the rich brown-crimson cap of the Redpoll, and before I had time to confound my ears with the more telling evidence of the

eye, another puff of impulse had caught them into the welkin and away beyond our ken.

Hoping next day to get another glimpse of living nature in the form of these winged spirits, we sallied forth after an early lunch past the field of their operations;—nothing to be seen, but the widespread carpet of snow with scattered stalks of weeds and dry brown clover heads protruding here and there.

A mile or more east, we turned down a side-road, and had just risen from swamp level with poplar and cedar thickets on either side, when a large cinnamon-brown bird flew across the road in front of us, apparently from the outskirts of an old deserted orchard on our right.

It settled forthwith, in some staghorn sumacs at the margin of the road within 4 or 5 yards of where we stood. Like many birds seen feeding in winter, it appeared remarkably tame; there it perched, while we scanned it leisurely through our glasses; a large bright-brown bird with broken lines of dark throistle flecks on its white breast, a long light brown tail apparently more than doubling the length of the bird; on the forward half of the wing two distinct, if not conspicuous bars of whitish, the upper somewhat shorter than the lower; unmistakably, the Brown Thrasher.

It presented a remarkable picture as it stood swaying slightly in the breeze among the stiff, naked and fantastically angled branches of the sumac; presently, craning forward and up, it drove its long slender bill into one of the quaint, velvety-crimson, candelabra seed-spikes of the "Staghorn," and ate voraciously. A slight breeze was blowing and the delicate plumes of the bird's neck and back ruffled and stirred with the play of the air as soft as thistledown; perhaps this fluffing of its feathers was a protest at the chill of our northern winter. Occasionally the breeze freshened and the bird almost lost its balance, reft of its beloved prop and windbreak of summer foliage; once I saw it partly unfurl the wings, but for the most part it used the long tail for a balancer, depressing and spreading the feathers fanwise in perfect adjustment to the streams of air.

From first to last the bird remained perfectly silent and careless, though aware of its observers. It little skilled to note that here and there in the sumac where the bird had perched, the stout velvety spikes had already been picked to the bone and nothing left but bare skeletons of stem and pedicel; or that on the snow-white floorcloth beneath lay a sprinkling of seed and husk—crumbs from the feast of previous days; none but the most

perverse of skeptics needed any such demonstration; in the directness with which the bird flew to the sumac, mounted its perch and fell to, the inference was already plain—here was its daily lunch counter where it had a standing order for one set dish and no other. Many of our winter residents shew this constant preference in their food; the Pine Grosbeak flocks to the rowan, the Evening Grosbeak to the Manitoba maple, with the same unerring flight as this Thrasher to the sumac.

We took our fill of this delightful sight and then passed quietly on, leaving the bird still "throng" at its simple one-course meal. The Brown Thrasher has given me many an hour of exquisite pleasure, listening to its rhapsodies of leafy June, but I would not for a wilderness of summer songbirds have missed this sight of him in our December barrens, and the image of it all will not quickly fade from the heart.

Twenty minutes later, as we retraced our steps on the next line south, we were stopped at the crest of a hill by a flock of Redpolls playing in the cedar shrubberies. The birds seemed to court the inner recesses of their thicket, and rather than be spied on presently rose in a twittering cloud and were wafted away to the south. We were just turning away with a sigh of pleased content at their joy of life, when we both on the instant became aware of some larger form moving about under the cedars, skulking in the shadows. Following its direction a few paces, we soon came abreast of it, and quite unconcernedly it stopped and faced about in an open place by the fence; by all the Powers! a Ground Robin or Towhee, and a male at that! black coat, jet hood and cape, white vest flanked at the wings with reddish brown, and when it turned away, a long black tail with conspicuous white margins and cross marks at the outer end.

What were these birds thinking about? Had Dan Whetung of Chemong deceived them to their undoing with his forecast of an open winter, or had birds and Indian chief alike misread the signs of the weather? December the 29th was a fine winter's day, bright and almost calm, with only 10 or 12 degrees of frost; but it is worth noting that three weeks earlier we had passed through a zero dip at least. Three times since, I have gone the same round, approaching the hallowed spots with bated breath, but no further vision has been vouchsafed; and I cannot even be sure whether these summer residents of ours ever managed to see the old year out, or sped south for their new year, as having outstayed their welcome in old Ontario.

NOTES AND OBSERVATIONS.

MIGRATORY BIRDS CONVENTION ACT PROSECUTIONS.

The following is a condensed list of some of the cases brought into court by officers of the Dominion Parks Branch, of the Department of the Interior. The Dominion Parks Branch will be pleased to receive notice of cases brought by private individuals or societies.

MARR MILLINERY COMPANY, LIMITED, St. John, New Brunswick, pleaded guilty to having possession of gull plumage, and a fine of \$10.00 was imposed.

NETTIE MCKINNON, Digby, Nova Scotia, fined \$10.00 for having gull plumage in her possession.

MISS G. P. MAWLEY, Summerside, Prince Edward Island, fined \$10.00 for having Brant out of season.

GEORGE ARSENAULT, St. Elinor's, Prince Edward Island, sold Brant in June and was fined \$10.00.

MR. MCADAM, manager, Island Cold Storage Company, Charlottetown, Prince Edward Island, fined \$10.00 for having Brant in his possession and birds confiscated.

FRANCIS RUGGLES, Caledonia, Nova Scotia, fined \$10.00 for shooting White-rumped Sandpipers.

EDGAR FROMM, FRANK DIXON and JOHN TINGLEY, Westmorland County, New Brunswick, were convicted for having black duck out of season, and penalties of \$20.00 each imposed.

T. G. BUTLER, Ottawa, fined \$10.00 for having a mounted loon.

JAMES BAKER, of Clam Harbour, Nova Scotia, found guilty of illegal possession of eider duck and fined \$10.00.

VICTOR CRAIN, of Boston, Massachusetts, found guilty and gun confiscated for shooting shore birds in Yarmouth County, Nova Scotia.

WALLACE HATFIELD, of Central Argyle, Nova Scotia, was convicted of shooting Willets.

CHARLES MUSE, of Central Argyle, Nova Scotia, also convicted for same offence.

FREEMAN DEVILLER, of Lower Melbourne, Nova Scotia, ordered to release young flock of ducks held in captivity.

The following mounted birds were confiscated at Ottawa: A Great Blue Heron, a Flicker, a Wood Duck, 3 Loons, a Herring Gull, and a Pileated Woodpecker.

EUGENE VAN ANBERG, of Lockport, Nova Scotia, found guilty and fined \$10.00 for shooting an eider duck.

ERNEST THOBURN, Lower Jordan Bay, Nova Scotia, fined \$10.00 for shooting eider duck.

WINSLOW BUCHANAN, Lower Sandy Bay, Nova Scotia, shot an eider duck, and was fined \$10.00.

THE ABSENCE OF SONG BIRDS IN THE WILDERNESS OF NOVA SCOTIA.—Any "bird man" who for the first time makes a trip to the wilderness country in the interior of the Province of Nova Scotia will be struck by the absence of bird songs. There are birds, it is true, but no real singers that at times compel us to pause in the act of dipping our paddle in the glassy lake or arrest our hasty step as some of our best feathered performers of the orchards and the clearings do. Occasionally the croak of a raven is heard or the *dee-dee* of chickadees, both the common variety and the Hudsonian, and at night the hoot of the Great-Horned Owl. The Canadian Jay is quite common and well known with his extremely slow and noiseless flight, and his discordant *ca-ca*. Occasionally a flock of Crossbills will pass overhead with undulating flight, spreading out and closing together again in fan-like fashion, leaving one wondering why they do not collide and injure their frail wings. The flute-like whistle of these little acrobats is quite pleasant when nearby, and yet it would be impossible to describe it as a song. During the fall months, one meets more

birds in the wilderness than in the spring or summer. These, also, however, are not real singers, with the exception of the robins which at this time are indifferent to song, being too busy fattening upon the luscious berries that cover the barrens in great profusion. When seen far from habitation and especially in the autumn they will nearly always be accompanied by Flickers, migrating together in perfect harmony, the latter "sticking" against the dead pine trunks while the robins seek the bare branches. I have watched them many times while moose calling in the early frosty mornings of September and October, and never have seen any discord among them. It is quite the reverse with the Canadian Jays, which seem to agree when not feeding, but quarrel fiercely, though ludicrously, when engaged in stealing from a moose carcass. These latter are very bold and it is a common sight to see them tearing at a moose carcass while the operation of gralloching is in process. Perhaps one will tear off a piece of fat and fly through the swamp with two or three others pursuing him, the tit-bit changing ownership many times before the fortunate one

is left to enjoy his prize in peace. Occasionally one sees a solitary Swamp Sparrow as he patters over the mud and trash caused by the overflow of lake or river. His discordant metallic *chink* does not impress one as a feathered friend at all. The first time I visited the Nova Scotia wilderness in quest of big game, when a boy of sixteen, I remarked upon the absence of crows to an old guide. "No sir," said he, "you will never see or hear one back here, but I should like to bring a live one out here and let him go; he wouldn't live long." "Why?" I queried. "Oh," the guide replied, "he would fly up to one of these big granite rocks

and caw himself to death trying to locate a friend." This fall I was surprised to hear a Song Sparrow burst forth into song. He was at least twenty-five miles from civilization. I waved my hat in his direction and wished him a safe journey south and an early return next spring. He was the exception to the rule.

We may sum up the perching birds that may be seen in the wilderness here as follows: Great-Horned Owl; Raven; Jay; Chickadee; Crossbill; Flicker; Robin; Hawk; Swamp Sparrow. The first five mentioned are residents.

H. A. P. SMITH, DIGBY, N.S.

BOOK NOTICES AND REVIEWS.

LEAD POISONING IN WATERFOWL, by Alexander Wetmore, Bulletin No. 793, U.S. Dept. Agr., Professional Paper, Washington, D.C., July 31, 1919. This is a twelve-page pamphlet of considerable interest to sportsmen, conservationists and ornithologists. Many of our ducking marshes have been shot over for a good many years. Each shot so fired scatters in the neighborhood of an ounce of shot over the bottom. Mr. Wetmore estimates that on one large marsh examined by him an average of 75,000 shells are fired annually. This amounts to over two tons a year. As lead shot resists corrosion and is practically everlasting, the effect is cumulative and amounts to over eighty tons in the past twenty years. The shot gradually sinks in the mud, of course, but as tipping ducks, such as Mallard, Pintail and others, dig down into it from 12 to 16 inches, it is evident that their opportunity for picking up shot is considerable. On examination the author found in the mud from the bottom in the neighborhood of favorite shooting stands from 20 to 22 No. 6 shot in each sample dredged up and examined. The ducks in sifting through the mud for food retain any small hard particle like gravel and the presence of real gravel does not seem to prevent them from taking the shot as well. Experiments on captive specimens of wild species proved that six pellets, often less, are fatal to ducks.

In this manner large numbers of ducks have been poisoned in certain marshes every year though it is only lately (see Bowles, *Auk*, XXV, 1908, pp. 312-313) that the cause of the deaths was recognized. By a process of experiment and elimination it was proved that it is the lead content and not the additions to the metal such as arsenic that causes the trouble, though chilled shot is less rapid in its effects than soft.

The paper deals at length with the symptoms and pathology of the poisoned conditions. The first ef-

fect is a weakening of the wing muscles until the power of flight is lost, difficulty is experienced in walking and partial or complete paralysis of the legs ensues. The wings drag and the tail droops. The bird's appetite remains good and even increases, but the food does not seem to pass the stomach and the proventriculus and lower esophagus become distended with food. The fecal matter is green and watery. The heart is finally affected and death comes in from a few days to five weeks.

Though magnesian sulphate in water, 60 grams to 10 quarts, seems to give relief and sometimes cure in individual treatments no suggestions as to treatment or prevention on a large scale is proposed. It is suggested that by its nature the trouble is more likely to increase than decrease but the author seems more anxious over the effect the lead poisoning will have, even in the cases of birds showing considerable resistance to or even recovery from it, on reproductive fertility, than over the number it actually kills.

So far only Mallards, Pintails, Canvas-backs, Whistling Swans and Marbled Godwits have been known to be affected, and as shot is common in stomachs of wild ducks examined by the Biological Survey, it seems that some individuals or species have more or less tolerance for, or resistance to, lead poisoning, or its effects would be more widespread and serious. It would be well for the sportsmen to look out for sickly ducks and examine them for lead poisoning, in order that fuller details may be known.

P. A. TAVERNER.

ANNOTATED CHECK LIST OF THE MACROLEPIDOPTERA OF ALBERTA. By Kenneth Bowman. Published by the Alberta Natural History Society, Red Deer, Alta., 16 pp., February, 1919.

For a number of years the late F. H. Wolley-

Dod, who was one of our leading lepidopterists, published in the *Canadian Entomologist*, a series of papers dealing with the lepidoptera of the province of Alberta. Since the appearance of Mr. Dod's last paper, however, other indefatigable collectors, particularly Messrs. Bowman and Mackie, of Edmonton, have added many records new to the province. The new list prepared by Mr. Bow-

man is certainly a useful publication and I have had many occasions to refer to it. In the preparation of this list the author has "endeavored to provide an epitomy of what has been accomplished by students of this order within the province to date, as an aid, not only to present workers, but those who will follow after."

ARTHUR GIBSON.

OTTAWA FIELD-NATURALISTS' CLUB SATURDAY AFTERNOON EXCURSIONS FOR THE SEASON OF 1920.

May 1. Geology.—Rockcliffe Park.—Meet at the first stop in the Park.

May 15. General natural history.—Catfish Bay, along the Ottawa River just west of Hull.—Meet in front of the Eddy Co's office.

May 29. Botany and Ornithology.—Fairy Lake. Take the Chelsea road electric car line to the end of the loop.

June 12. Entomology (Mr. C. B. Hutchings, Leader).—Queen's Park, Aylmer.

June 26. Horticulture (Mr. W. T. Macoun, Leader).—Central Experimental Farm, Ottawa.

Sept. 18. General natural history.—Britannia.

The time of meeting at the points indicated will

be 2.45 p.m. Leaders conversant with the subjects mentioned will be present to render assistance. All interested are cordially invited to attend.

An unusually well-attended meeting of the Excursions Committee of The Ottawa Field Naturalists' Club was held on the afternoon of April 8, for the purpose of formulating the above programme for the coming season.

Reference was made incidentally to two very enjoyable reunions of the Club held during the past winter, and the intention was expressed of holding similar meetings and outings during the next winter season.

OBITUARY.

JAMES MELVILLE MACOUN, C.M.G.

Succumbing to a fatal illness, James Melville Macoun, C.M.G., passed peacefully away, in Ottawa, on January 8th, 1920.

The late James Macoun was born in Belleville, Ont., in 1862, and was the son of Professor John Macoun, the illustrious Father of Canadian Botany, who, living at Sidney, on Vancouver Island, B.C., is still active in natural history research. James Macoun attended the Belleville High School and Albert College, where, at that time, his father was Professor of Botany. When, in 1882, Professor Macoun was called to Ottawa to take charge of the botanical and other natural history work in the Geological Survey, James Macoun became his Assistant, beginning regular work with the Dominion Government in 1883. As early as 1881, however, he assisted his father in field work, exploring the territory between Portage la Prairie, Man., and the headwaters of the Assiniboine.

James Macoun was a born naturalist and natural history explorer. Although, by natural inclination, he gradually specialized in botany, he made most valuable contributions in other branches of natural

history. The wideness of the extensive scope of work in which Mr. Macoun was engaged during his long career as a Canadian naturalist may be more fully realized from the brief data which are presented herewith.

In 1884, at the age of twenty-two, Mr. Macoun made extensive collections of Cambro-Silurian fossils in the Red River valley, Man., on the west shore of Lake Winnipeg, and on the adjacent islands. In 1885, he collected natural history specimens in general in the Lake Mistassini district in the Province of Quebec and, the following year, worked along the line from Lake Winnipeg, Man., to Hudson bay. In 1887, Mr. Macoun explored islands of James Bay and contributed much interesting information, floristic and zoological, to the knowledge of the natural history of the southern part of the Hudson Bay region.

In 1888, he collected plants and birds along the Athabaska and the Churchill rivers, and in the following year collected, with his father, birds, mammals, reptiles and insects in British Columbia. He also greatly assisted his father in making a very

complete collection of the flora from the Pacific Coast to the Eagle Pass in the Gold Range, a distance of nearly 400 miles on the Canadian Pacific Railway. In 1890, he again worked in British Columbia, assisting his father collecting on the Columbia river along the Kootenay lake, and in the Selkirk and Rocky mountains.

Up to this time, Mr. Macoun had devoted his time and energy to natural history study in general. His intimate knowledge of methods and his ability to draw reliable conclusions from his findings were then fully recognized by the Geological Survey and, as a result, his wide knowledge and his skill as an

ence at Washington, D.C. Because of his most valuable work on the international fur seal investigations he was made a C.M.G., at the recommendation of Lord Bryce, then British Ambassador to Washington.

Mr. Macoun's intimate knowledge of Canada's forestry resources was taken particular advantage of by the Government in 1899. That year Mr. Macoun was placed in charge of the Canadian Forestry Exhibit, which was to be displayed at the Paris Exposition in 1900. Mr. Macoun brought together a magnificent collection of Canadian forestry products which, when exhibited in Paris, most



JAMES M. MACOUN, C.M.G.

investigator soon prompted the Government to engage him in special and important work.

When, in 1891, the fur seal conditions in the Northern Pacific became of international importance, Mr. Macoun was made Secretary to the late Dr. G. M. Dawson, Director of the Geological Survey and Behring Sea Commissioner of Canada, and in this capacity he went to the North Pacific to investigate the fur seal conditions. His services in the study of the habits and life history of the fur seal proved so valuable that he was retained on this special work in 1892 and 1893, and sent to Europe as an expert in connection with the Fur Seal Arbitration. In 1896 he again went to Behring Sea, and also in 1914. In 1911, he was one of Canada's representatives at the Fur Seal Confer-

strikingly demonstrated to all Europe the immense timber resources of the Dominion.

When in Paris, in 1900, Mr. Macoun also attended the International Congress of Botanists, which was called together for the purpose of drafting rules and regulations to govern the use of botanical nomenclature. On behalf of Canada, Mr. Macoun signed the recommendations which later were adopted at the International Congress at Vienna, thus committing Canadian botanists in official positions to adhere to the so-called "Vienna rules of nomenclature" in botany.

In 1903, Mr. Macoun undertook an investigation of the Peace river country in general, and of the upper portion in particular, to ascertain the true character of the soil and climate of that part of

Canada. His resultant report displays, in the amplest degree, a faculty of observation given to but a very limited number of investigators, and a fearlessness in presenting the results of findings which is, and always will be, the highest and most valued characteristic of a genuine scientific investigator and a true public servant.

When not engaged in the special work briefly referred to, Mr. Macoun was, during his last 20 years, largely occupied with botanical work, except in 1909, when he spent considerable time assisting his father in the preparation of the "Catalogue of Canadian Birds." Remaining in Ottawa during the summer of 1897, for the first time since being connected with the Geological Survey, Mr. Macoun made a special study of the violets of the Ottawa region, discovering species new to science, and in 1913 he again collected in the Ottawa region, supplementing the botanical material which had been brought together by his father and himself with a view of publishing a "Flora of the Ottawa District." In 1910, Mr. Macoun studied the fauna and flora on the west coast of Hudson bay, and, in 1912, he was engaged in botanical work on Vancouver island, particularly in Strathcona Park where several species new to Canada as well as to science were discovered. From 1914, he worked in British Columbia and in Jasper Park, Alberta. The islands of the Gulf of Georgia, as well as the Comox district of Vancouver island, were thoroughly investigated from a botanical standpoint. During the last two years, Mr. Macoun made a most complete botanical survey of Jasper Park, Alta., extending his working field the last year westward along the Grand Trunk Pacific railway.

Mr. Macoun was appointed Assistant Naturalist in the Geological Survey in 1898 and Botanist in 1917. In 1918, he was appointed Chief of the Biological Division.

This brief outline of Mr. Macoun's field work and career as a naturalist may give some idea, although a rather incomplete and vague one, of the magnitude of the scope of work undertaken by him.

His unique record will, by force of its excellence, guarantee him an ever-honoured place as a Canadian naturalist of the highest rank. As a botanist, particularly, he contributed enormously to the knowl-

edge and understanding of the Canadian flora. His extensive travels made him familiar with the flora from eastern Canada to the extreme islands off the Pacific coast, and from the hot and arid parts of southern British Columbia to the tundra of the Arctic. No one in Canada, with the exception of his illustrious father, ever possessed such a thorough knowledge of the Canadian flora as did James Macoun, and, as a result, he was justly recognized and esteemed as the greatest authority in matters botanical, next to his venerable father, that Canada ever produced. His name is indelibly written on the pages of the History of Canadian Botany.

Mr. Macoun's fame as a botanist and as a naturalist in general may be contributed to three main characteristics, namely, a brilliancy of mind enabling him to grasp quickly and accurately the central idea of arguments and the relative value of evidence presented, an in-born love of investigations for the sake of the investigation itself, and a fund of energy which permitted no physical obstacles to be raised in the way of his investigational efforts.

Extremely modest and unassuming, Mr. Macoun was the type of scientist who derives complete satisfaction from the conscientious persecution of his work without seeking public reward for the service done.

Mr. Macoun was a true scientist whose untimely death is sincerely deplored by his many scientific and other friends. The Ottawa Field-Naturalists' Club is feeling his departure deeply and recently expressed its sentiments in the following resolution:

"The members of the Ottawa Field-Naturalists' Club desire to place on record their deep sorrow in the death of their fellow member and friend, Mr. James M. Macoun, C.M.G. Mr. Macoun's reputation as a careful, conscientious naturalist was by no means confined to Canada. In his death the Geological Survey has lost a valuable officer and members of the Ottawa Field-Naturalists' Club a true friend, ever ready to assist, not only in the furtherance of the botany of Canada, but in other branches of natural history as well. The council desires to express its sincerest sympathy to his widow and daughter."

M. O. MALTE.



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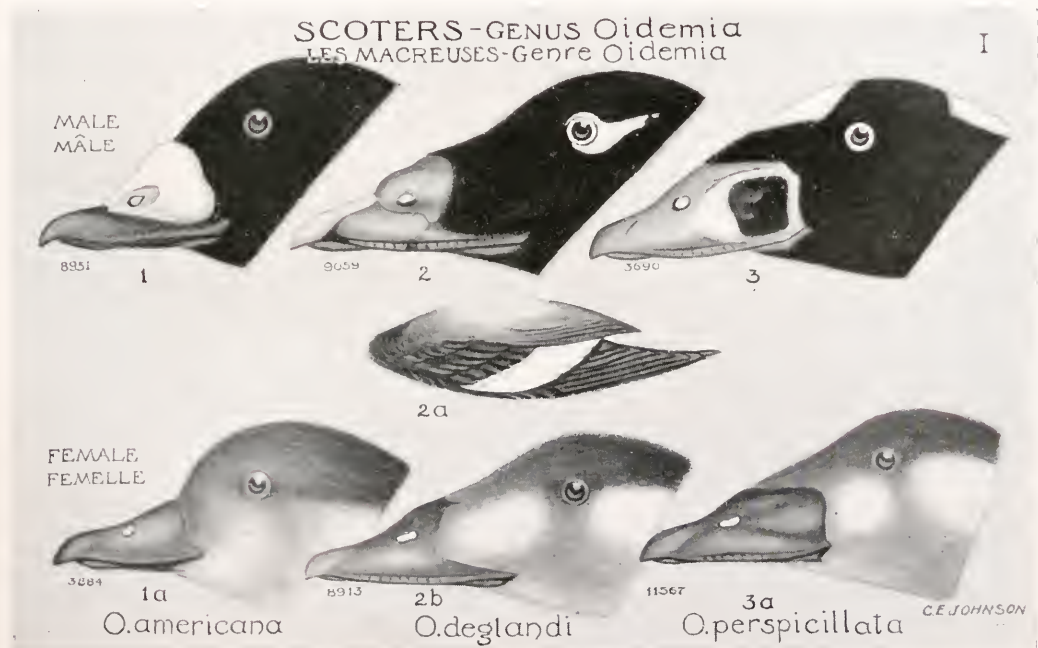
THE SCOTERS AND EIDERS.

By P. A. TAVERNER.

(PUBLISHED BY PERMISSION OF THE GEOLOGICAL SURVEY OF CANADA.)

The scoters and eiders are often regarded by the amateur ornithologist and the general sportsman as confusing groups. Whilst the males are well marked by color and bill characters some females bear close general resemblance to each other. The following diagnosis and plates may therefore be of interest to those who have occasion to identify these

swellings, protuberances and extended processes. In the females these bill characters are reduced; but, except in the American Scoter, they retain enough peculiarity of shape for ready generic recognition. Generally juvenile males are similar to the females but soon show sufficient traces of the coming adult plumage to indicate their sex.



species. Two species of eider, Steller's and the Spectacled, are rather different from the others, but as they only are to be expected in the extreme north-west, Alaska and the Yukon, they need rarely be considered in connection with eastern material.

Except these two species, the scoters and eiders are ducks of the largest and sturdiest build. As the accompanying plates show, the males are characterized by unusually heavy bills often with strange

THE SCOTERS.

The adult males of all the scoters are practically solidly black birds or with only restricted and sharply defined patches of pure white on head or wing. The females are without variegation, dark brown gradually lightening below or on breast and face, and show no indication of bars or streaks. The bills of all plumages except that of the female American Scoter are characteristic.

AMERICAN SCOTER, *Oidemia americana*.

Plate I, Figs. 1, 1a.

The adult male is solidly black without spot or touch of other colour except the butter-coloured swelling at base of bill. The female shows a comparatively normal duck bill, the feathering neither encroached upon nor encroaching on the sides of the bill. There is a more or less well defined dark cap including the sides of the crown, contrasting with the cheeks that are evenly coloured instead of showing two diffused light patches as in the other two scoters.

be traced in a depressed area of soft black velvet-like feathers. The sides of the bill encroaches on the cheek feathering in a square shape and is coloured bright yellow, red and white with a strange squarish spot of black as shown. The female has two lightish patches on the sides of the face like the female White-winged, but the bill surface intrudes upon the feathering of the cheek in the same square shape as in the male and the feathering of the crown extends half way to the nostril and far beyond that on the sides of the bill. The square black spot at the base of the bill is indicated in the

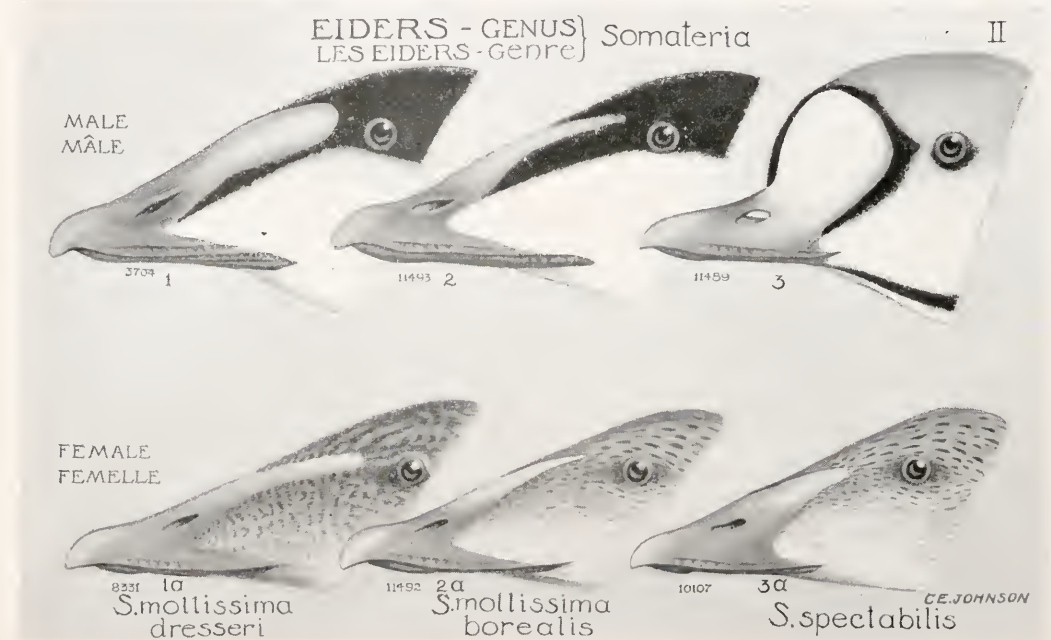
WHITE-WINGED SCOTER, *Oidemia deglandi*.

Plate I, Figs. 2, 2a, 2b.

The prominent white wing patches (Fig. 2a) in all plumages of this bird prevents its confusion with any other species. The adult male is all black with a white crescent under the eye, white secondaries and a bill coloured in bright reds and black. The female has two vague light spots on the cheek like the Surf Scoter, and the feathering of the cheeks encroaches upon the sides of the bill nearly to the nostrils and about as far as that of the crown.

SURF SCOTER, *Oidemia perspicillata*.

Plate I, Figs. 3, 3a.

The adult male is an all black bird with small white patches on the fore and hind crown. In some changing or moulting plumages this latter is lost wholly or in part but its position and outline can still

juvenile male at an early age and before other sexual characters are assumed.

THE EIDERS.

Adult male eiders are easily distinguished from similar scoters by being colored in large contrasted masses of black and white, the latter variously suffused on face, fore and under parts with delicate Nile-green, pale slate-blue or vinaceous (pinkish). Comparable scoters are nearly solid black, relieved only by restricted, sharply defined patches of pure white about head and on wings.

Female eiders are colored with mixtures of black, brown, ochre and rusty in various proportions, tending towards fine streaks on face, coarser ones and V-shaped markings on back and broken bars across breast and flanks. The cross barring across the upper breast of the females is sufficiently distinctive of the eiders to separate them from any other duck

regularly occurring in Canada. Comparable scoteis are solidly coloured dark brown without variegation except for gradual lightnings of face, fore parts, and below,—they are entirely without bars or streaks.

KING EIDER, *Somaeria spectabilis*.

Plate II, Figs. 3, 3a.

The greatly enlarged bill process, coloured bright yellow, easily distinguishes the male of this species. The feathering of the fore crown and the cheeks are diagnostic in other plumages. In this species the crown feathers extend down the ridge of the bill as far as the rear of the nostrils, whilst the feathering of the cheeks does not extend as far as that of the crown. In other comparable eiders the

the Northern Eider, *Somateria mollissima borealis* can be shown to exist. The American Eider therefore becomes *Somateria mollissima dresseri*. These two American forms can only be separated by the bill processes on the sides of the crown. In the American Eider these processes in either sex are broad and end in a well rounded instead of a pointed tip as in the Northern and the Pacific Eiders.

PACIFIC EIDER, *Somateria v. nigra*.

Plate III, Figs. 2, 2a.

The Pacific Eider can usually be told from the Atlantic Eider by the black V-mark on the throat similar to that of the King Eider. In occasional



cheek feathering projects forward of that of the crown.

ATLANTIC EIDER, *Somateria mollissima*.

Plate II, Figs. 1, 1a, 2, 2a.

The long Y-shaped arms of the bill processes extending up the sides of the crown are distinctive of the male Atlantic and the Pacific Eiders. In the females of these species the crown feathering not nearly reaching to the nostrils and the cheek feathers extending beyond those of the crown are diagnostic.

In the 1910 A.O.U. Check List, the standard authority, the American Eider is given as a full species, *Somateria dresseri*. Late investigation, however, has shown that it is only a subspecies of the eider common to the New and Old Worlds (Atlantic Eider), as all intermediates between it and

Atlantic specimens this throat mark is said to be present, in which case and in females, the relatively larger and heavier bill, the shorter and more acutely pointed bill processes on the fore crown, and the slightly blunter ending of the feathering on the sides of the bill of the Pacific seem to be the only diagnostic guides. None of these points are satisfactorily obvious or reliable but the ranges of the two species are so widely separated that it will only be birds from a limited section of the Arctics or occasional stragglers that need ever be confused.

SPECTACLED EIDER, *Arctonetta fischeri*.

Plate III, Figs. 3, 3a.

The white spot about the eye and the black spectacle mark of the male Spectacled Eider is unmistakable. In the female this white eye spot is indi-

cated by a similar patch of feathers scarcely distinguishable from the surrounding area in coloration but of peculiar velvety texture that makes its outlines obvious. In all plumages the feather line of the bill is distinctive, extending down the culmen of the bill well over the nostril, cutting in an almost straight line from thence to the gape at the sides.

STELLER'S EIDER, *Polysticta stelleri*.

Plate III, Figs. 1, 1a, 1b.

This is the smallest and the most divergent of the eiders. The male with his strangely pied head and silvery sheen on face is distinctive. The female can be recognized from other eiders by its steel blue

speculum edged above and below with a white line like a mallard.

Probably the bill gives the most satisfactory single character for the recognition of the species. Coues says of it,—“tomial edges dilated and leathery.” In all dry specimens seen by the writer the edges of the upper mandible are incurved, (Fig. 1.a) probably the results of drying, and the normal condition of preserved specimens.

It is thus seen that by comparing the feathering characters about the base of the bill nearly all of these species can be readily identified. With the plates this task should be easy.

FURTHER NOTES ON THE ORCHIDS OF HATLEY, STANSTEAD COUNTY, QUEBEC, 1919.

BY H. MOUSLEY.

In my last paper on the orchids of Hatley (*Ottawa Naturalist*, Vol. xxxii., 1918, No. 8, pp. 144-147) after recording eighteen species, I concluded by suggesting, that even then, the possibilities of the place might only have been touched upon, seeing that practically the whole of my time had been devoted to the birds, and very little attention paid to the orchids, it having taken eight years to locate the above eighteen species. Now in order to put the above suggestion to the test, and at the same time gratify a long felt wish of becoming better acquainted with the ferns of the district, I decided early in 1919, not without much deliberation however, to entirely ignore the birds after the spring migration, and devote the rest of the summer months or until such time as the fall migration set in, to the collecting of ferns, and any further species of orchids, should that indeed be possible.

The weather entirely favoured my plans, it being very hot on and off, all through June and July, with a good deal of humidity in the air, which entirely suited the orchids, many appearing in greater profusion and blooming earlier, than in previous years. Of the ferns, probably forty species have been collected, including the Adder's Tongue (*O. vulgatum*) and at least six species and forms of Botrychiums, two of which have never been found in the Province of Quebec before. These however, will be dealt with in a separate paper, when they have been further critically examined.

Now I have noticed in some of the text books, that it is a moot point in many localities, as to which of the three following orchids is the earliest bloomer, namely, *Cypripedium acaule*, *Orchis spectabile* or *Calypso bulbosa*. There need be no mystery con-

cerning this at Hatley, for it is certainly the lovely little *Calypso*, which was much more plentiful in 1919 than in the year previous. As regards the showy Lady's Slipper (*C. hirsutum*), I am glad to say after the disaster that overtook the species in 1918 (as previously described), it was found this year growing in greater profusion than ever, one little patch alone containing forty-one blooms, whilst another close to, had seventeen. I only found a few plants, however, with more than one bloom, three blooms being the most in any case. Four snow-white blooms of the Mocassin or Pink Lady's Slipper (*C. acaule*) were noted. Of the *Habenarias*, I came across one very large plant of the Tall Leafy Green Orchis (*H. hyperborea*), the height of which including the raceme was 9.5 dm., the raceme being 3 dm. I have noticed the larger plants of this *Habenaria*, bloom much earlier as a rule than the smaller ones, and grow in certain localities only. Can it be that they belong to a distinct species?, a contingency not altogether unlikely in *hyperborea*, which is supposed by some authors to include several species.

With the exception of the Wide-leaved Ladies Tresses (*Spiranthes lucida*), I have this year (1919) found all of the other seventeen species enumerated in my previous paper, besides adding another twelve. It will thus be seen, that my total now stands at thirty species and forms of these rare and interesting plants that I have located at Hatley, or considerably more than one-third of all those to be found in eastern North America, and all have been gathered within a space of four square miles. The record for the Gray's Manual area has been made in the State of Vermont I believe, where

thirty-three species of orchids have been collected in a given space of five square miles. This being so, it looks as though I can now safely lay claim to second honours for the Province of Quebec.

Appended is an annotated list of the twelve new species found this year (1919), as well as an abbreviated one, for the benefit of those wishing to see at a glance, the total number of orchids, approximate dates when, and number of stations at which, they have been found.

LARGE ROUND-LEAVED ORCHIS, *Habenaria orbiculata* (Pursh) Torr. I first came across this orchid on June 8, four plants in leaf only being found at this date. On subsequent visits, however, I increased this number to eleven, but none of these bloomed, with the exception of one, which when I went to gather it the first time, was not quite fully out. Returning a few days later, I was disappointed to find that the flower had been eaten off, probably by some cows, of which there were a good many grazing in the immediated neighbourhood. Most of the plants were growing under hemlock trees, in company with *C. acaule* and *E. tessellata*.

Habenaria macrophylla Goldie. In addition to the eleven plants mentioned above, were two with very much larger leaves than any of the others. Fortunately one of these bloomed, and I think I am justified in recording it as *macrophylla*, for in addition to the size of its leaves, the scape was 41 cm. high, and none of the spurs were less than 3 cm. long, both of these dimensions considerably exceeding those given in Gray's Manual for *orbiculata*. The raceme was 11 cm. long and 5 cm. through, and held fourteen flowers. I first found this particular plant on June 13, the scape then being 18 cm. high, which had increased to 28 cm. by June 22. It was not, however, until the beginning of July, that its full height of 41 cm. was attained, and by the thirteenth, all the fourteen flowers were fully developed, making it, if not exactly a showy, still a fine, and uncommon looking plant, in my opinion.

x *Habenaria Andrewsii*, White. I have no vernacular name for this supposed hybrid between *H. psycodes* and *H. lacera*. I first came across it on July 26, when I found one perfectly white bloom, and one almost so, the top of the raceme only being suffused with pink. They puzzled me at the time, but I entered the record in my Gray's Manual under the above, with a note of interrogation, however, scarcely believing that they could be *Andrewsii*, seeing that there were no *H. lacera* about. Fortunately about a week after, I had the pleasure of

Mr. Ludlow Griscom's company for a few days botanizing, and on August 3, he came across another plant, which also puzzled him. However, on taking it home and critically examining it, he came to the conclusion that it was really *Andrewsii*, and on submitting it to Mr. Oakes Ames, his identification was confirmed. Mr. Ames at the same time questioning the correctness of regarding it as a hybrid between *H. psycodes* x *lacera*. I understand the plant has been found commonly in Newfoundland, which has also aroused suspicion as to its being a hybrid between *H. psycodes* x *lacera*. It may be of interest to here give Mr. Oakes Ames' exact label of determination of the above specimen, which is as follows, viz.: "*Habenaria Andrewsii* White? The divisions of the labellum not as deeply fringed as in Andrew's specimens from Vermont. This specimen is more like material from Newfoundland (Fernald and Wiegand 5216). The raceme of this specimen is rather characteristic of the hybrid. It may be convenient to regard it as of hybrid origin, with *psycodes lacera* parentage!" It seems obvious from this comment, that my failure to find *lacera* anywhere in the district, is an interesting piece of evidence.

LARGE PURPLE FRINGED ORCHIS, *Habenaria fimbriata* (Ait) R. Br. It was not until July 10, that I came upon a colony of these delicate belles of the swamp, as Thoreau calls them, alluding to the peculiar charm of the pale pink flowers. The larger, paler flowered, and usually more open raceme, distinguishes this species from its cousin *H. psycodes*, besides which it generally occurs in more shady situations than the latter. One very fine plant that I found, had a total height of 9.5 dm., the raceme being 18 cm. long by 5 cm. through, and the four large leaves were 16-18 cm. long by 6-10 cm. broad. My dates for fresh blooms, range from the tenth to about the middle of July, but judging from the condition of those on the tenth, it is evidently to be found somewhat earlier.

GRASS PINK, *Calopogon pulchellus* (Sw.) R. Br. The peculiarity of this lovely magenta crimson orchid, consists in its not having the ovary twisted, so that consequently the lip is on the upper, instead of the lower side of the flower. Apparently it is rare at Hatley, for I have only found one station for it so far, in the large bog to the north-east of the village, and then only a very few plants could be located. It was in bloom from July 8-15.

SLENDER LADIES' TRESSES, *Spiranthes gracilis* (Bigel) Beck. This slender little orchid like the Grass Pink, is apparently rare here, only one sta-

tion with three plants having so far been discovered. Two of these were found on July 16, and the remaining one on July 25, but they were not in bloom until August 3. The situation consisted of some very dry hilly knolls, on the outskirts of a large wood, and I am not likely to forget the day, seeing that at the same time I also discovered the Green Adder's Mouth (*Microstylis unifolia*), and those rare little ferns the Adder's Tongue (*Ophioglossum vulgatum*), and Little Grape Fern (*Botrychium simplex*), the dry location for these three latter, being somewhat uncommon, as they generally occur in damper situations as a rule.

HODDIGES RATTLESNAKE PLANTAIN, *Epipactis tessellata* (Lodd) A. A. Eaton. I really found this orchid away back in 1915, but as it was not then in bloom, and I was unacquainted with the difference in the shape, size, and colouring of its leaves, to those of *E. repens*, I passed it over, and took it for the latter species. However in the fall of 1918, I came across a few dead scapes, which by their size and height, struck me at once as not being *repens*, but something new. This idea was further strengthened in the following spring, when the difference in the leaves was noticed, and later in July when the flowers appeared, all doubt was at an end, as they were then seen to be the present species, and not *repens*.

HEART-LEAVED TWAYBLADE, *Listera cordata* (Lin.) R. Br. This little orchid even if it were common, would nevertheless be hard to find, owing to its small size, and inconspicuous madder-purple flowers. I first came across it on June 8, of the present year (1919), growing amongst sphagnum moss, in a damp wood to the north-west of the village, and again on July 8, in the large bog to the north-east of the village, and yet again on August 4 (one plant only), in the woods surrounding the great Brulé bog near Waterville, some miles also to the north-east of Hatley. In the first mentioned locality, I found bunches of eight, ten, nineteen, and in one case as many as twenty-seven plants, all growing somewhat closely together. In two cases, there was a small bract leaf (the same as often occurs in *H. obtusata*), at the base of the raceme, and in a few the lip was devoid of madder-purple, this giving the whole raceme a green appearance. My dates for fresh blooms, range from June 8 to July 3. In "THE CANADIAN NATURALIST," 1840, pp. 297-303, Gosse gives a good account of the Brulé, describing it as exactly resembling the bogs of Newfoundland. It consists of some thousands of acres, and is said to owe its origin to the beavers, which were formerly numerous, damming up the streams, which overflowing and spreading over the flat lands, killed the growing timber. When Mr. Griscom and I visited it for the first time, on August 4, we both

came to the conclusion, that there were great possibilities regarding the place. Seven different orchids were found, even at this somewhat late date, as well as many of the plants, shrubs and trees, mentioned by Gosse as growing in similar situations in Newfoundland, including black spruce, which I had not noticed here before. It is hoped to again visit the locality early in June, when good results are expected, especially in regard to the orchids, of which our trip in August gave promise.

LARGE CORAL ROOT, *Corallorrhiza maculata* Raf. It was not until August 9, that I came upon a little colony of this species, consisting of forty plants, the blooms of which were over of course, but the fruit still remained. They were found growing in a small cedar wood, on some dry sloping ground, about two miles to the south-east of the village. Later on, or on August 21, another plant was shown to me on the roadside, some few miles to the north of the present site, but also on the east of the village.

WHITE ADDER'S MOUTH, *Microstylis monophyllos* (Linn) Lindl. This rare little orchid like many others, is easily passed over, unless you are specially looking for it, which no doubt accounts for my having found it during the present season (1919), when all my energies were devoted to the fern and orchid families, instead of the birds. The situation was a low damp one, at the edge of a little wood, where twenty-four plants were located. Later on I found one other plant in a similar situation, two miles to the north-west of the village, whereas the first locality was two miles to the south-east of it. The plants were just in their prime on June 30, the day on which I found them.

GREEN ADDER'S MOUTH, *Microstylis unifolia* (Michx.) B.S.P. This is another somewhat inconspicuous little plant, but is much commoner than *monophyllos*, there being at least five stations at which I have found it, and generally in somewhat goodly numbers. Its habitat seems to vary a good deal, the situation sometimes being very dry, as already mentioned in the account of the Slender Ladies' Tresses, and at others very damp, the same as those favoured by *monophyllos*.

LOESEL'S TWAYBLADE, *Liparis Loeselii* (Linn) Richard. This is another of those somewhat inconspicuous little orchids, and one which I must have passed over many times, before finally noticing it in bloom, on July 12 of the present year (1919). It certainly favours very wet boggy places, especially those where the water drains out of the land, at the foot of hill-sides. At present I have located about four stations, where its numbers vary considerably, from three plants in one, to some dozens in another. My data for fresh blooms range from June 27 to July 5.

List of the orchids of Hatley, with approx. stations, and dates of flowering.

Stations	Species	Flowering	Stations	Species	Flowering
			1	<i>Arethusa bulbosa</i>	June 11-July 17
3	<i>Cypripedium parviflorum</i>	May 29-June 10	1	<i>Spiranthes lucida</i>	Aug. 3
3	do do			(three plants only)	
	var <i>pubescens</i>	May 28-June 18	1	<i>Spiranthes lucida</i>	July 20
				(one plant only)	
2	<i>Cypripedium hirsutum</i>	June 14-July 17	Many	<i>Spiranthes cernua</i>	Aug. 17-Oct. 17
8	do <i>acaule</i>	May 24-June 18	Many	do <i>Romanzoffiana</i>	July 16-Aug. 22
4	<i>Orchis spectabilis</i>	June 1	4	<i>Epipactis repens</i> var	
4	<i>Habenaria bracteata</i>	May 20-June 11		<i>ophioides</i>	July 22-Aug. 22
Many	do <i>hyperborea</i>	May 31-July 25	4	<i>Epipactis tessellata</i>	July 8-Aug. 2
2	do <i>dilatata</i>	June 18-July 26	3	<i>Listera cordata</i>	June 8-July 3
Many	do <i>obtusata</i>	June 8-July 17	6	do <i>convallarioides</i>	June 18-July 17
2	do <i>orbiculata</i>	July 8	Many	<i>Corallorrhiza trifida</i>	May 20-June 15
1	do <i>macrophylla</i>	July 13	2	do <i>maculata</i>	Aug. 9 (in seed)
Many	do <i>psycodes</i>	July 19-Aug. 15	2	<i>Microstylis monophyllos</i>	June 30-July 4
2	do <i>Andrewsii</i>	July 26-Aug. 3	5	do <i>unifolia</i>	July 12-Aug. 3
2	do <i>fimbriata</i>	July 10-17	4	<i>Liparis Loeselii</i>	June 27-July 5
1	<i>Calopogon pulchellus</i>	July 8-15	1	<i>Calypto bulbosa</i>	May 15-28

AN ANNOTATED LIST OF THE BIRDS OF COLDSTREAM, ONTARIO, VICINITY.

By A. A. Wood.

1. HOEBOELL'S GREBE, *Colymbus holboelli*. One shot, Oct. 6, 1902, on Duncrief pond—four miles north of Coldstream—by Roger T. Hedley. The specimen is in my collection, No. 1,402.

2. HORNED GREBE, *Colymbus auritus*. A few stop on the mill-pond nearly every spring; only an occasional one seen in fall. They seem much friendlier than the Pied-bill, while here, especially when a single bird comes. If you sit quietly at edge of pond, it will swim within a few feet of you then fly to other end of pond, only to drift back again. It will repeat this several times, uttering its plaintive cry at intervals.

3. PIED-BILLED GREBE, *Podilymbus podiceps*. A pair bred here quite regularly previous to 1904: rather rare now in spring; common and regular in fall.

4. LOON, *Gavia immer*. A single bird seen every three or four years in spring; rare in fall.

5. HERRING GULL, *Larus argentatus*. A few small flocks pass through each spring and fall, some resting on the pond a few hours. I think the birds that touch here are passing between Lakes Huron and Erie. Coldstream is about in a straight line between Grand Bend and Pt. Stanley making it nearly a fifty mile flight direct.

6. BONAPARTE'S GULL, *Larus philadelphia*. Two came in spring of 1900. One was shot. Have a specimen taken by R. T. Hedley, at Duncrief, Apr. 26, 1902.

7. COMMON TERN, *Sterna hirundo*. I have two specimens shot by R. T. Hedley at Duncrief; the first, I believe to be taken in Middlesex.

8. BLACK TERN, *Hydrochelidon nigra surinamensis*. One specimen in my collection taken by R. T. Hedley at Duncrief—also a first record for this county.

9. MERGANSER, *Mergus americanus*. A few stay in the open rapids of the creek every other year, through January and February often they will walk away from the water in the snow considerable distances.

10. HOODED MERGANSER, *Lophodytes cucullatus*. Not regular. Have taken them both spring and autumn.

11. MALLARD, *Anas platyrhynchos*. Very irregular; more seen at Duncrief.

12. BLACK DUCK, *Anas rubripes*. Fairly common migrant. A flock of nearly 200 stayed in a slough, two miles south, about two weeks in August, 1917. The flocks very seldom come to the ponds; they seem to like the little sloughs back in the fields, especially late in the season.

13. GREEN-WINGED TEAL, *Nettion carolinense*. I have never seen them near in spring; always a few come through in the fall.

14. BLUE-WINGED TEAL, *Querquedula discors*. Not as common as the Green-wing.

15. SHOVELLER, *Spatula clypeata*. Only one specimen noted.

16. WOOD DUCK, *Aix sponsa*. Very rare now. Occasionally one or two stop at Komoka—eight miles south.

17. REDHEAD, *Marila americana*. Frequently one is met with in fall along with the Teals.

18. SCAUP DUCK, *Marila marila*. R. T. Hedley has a specimen he took at Duncrief, which, the late Robert Elliott of Plover Mills, Ont., identified as *M. marila*.

19. LESSER SCAUP DUCK, *Marila affinis*. Regular spring and fall visitor. The latest spring record I have is May 10, 1916.

20. GOLDEN-EYE, *Clangula clangula*. Nearly always appears spring and fall. Occasionally stays on the creek with the Mergansers. A flock of 20 came to the pond one fall.

21. BARROW'S GOLDEN-EYE, *Clangula islandica*. I have a young male I shot here October 17, 1917. The only Golden-eye seen with the crescent spot.

22. BUFFLEHEAD, *Charitonetta albeola*. Our commonest duck. They usually stay a day or two if unmolested.

23. OLD SQUAW, *Harelda hyemalis*. A male in full plumage was taken at the Duncrief pond by R. T. Hedley.

24. KING EIDER, *Somateria spectabilis*. One taken at Duncrief by R. T. Hedley, November 24, 1900; the first Middlesex record. The specimen is in the collection of W. E. Saunders, of London.

25. WHITE-WINGED SCOTER, *Oidemia deglandi*. I have a specimen taken by R. T. Hedley, at Duncrief.

26. RUDDY DUCK, *Erismatura jamaicensis*. Rare fall migrant.

27. CANADA GOOSE, *Branta canadensis*. Abundant migrant. Sometimes feeding on the wheat fields in spring.

28. CANADA BITTERN, *Botaurus lentiginosus*. Always present during the breeding season. They have their eggs laid by June 3.

29. LEAST BITTERN, *Ixobrychus exilis*. Took one September 13, 1917, the only individual I have seen near Coldstream.

30. GREAT BLUE HERON, *Ardea herodias*. There is a black ash swamp $2\frac{1}{2}$ miles east, where about 22 pairs have nested for years. The majority of the nest-trees are very tall dead ashes standing in water; in most cases next to impossible to reach. A set of six was taken from there by Clifford Zavitz, May 10, 1901; incubation was very far advanced, as they are through laying the last week in April. There is always a pair of Great Horned Owls staying there, as well as in the heronry north of here. A heron has spent the winter along the creek several times.

31. GREEN HERON, *Butorides virescens*. A pair

nest here regularly. Four nests observed were—two in cedar, one in aspen and one in hawthorn, all quite near the creek. Last year the crows destroyed one set of five. Four more were laid in the same nest.

32. VIRGINIA RAIL, *Rallus virginianus*. Rather scarce. Usually a pair breeds. I found the young birds one season; have sets of nine and ten eggs.

33. SORA, *Porzana carolina*. At least one pair seen each year. In one nest containing fifteen eggs, they were piled up in two layers.

34. COOT, *Fulica americana*. Occasionally breeds, but much more frequently seen in the fall.

35. WOODCOCK, *Philohela minor*. Scarce now but a pair always breeds. Young birds seen quite regularly. I saw a nest with four infertile eggs, May 10, 1915. The bird allowed me to stroke her head before leaving. Evidently just the female was present that year, as during repeated waits in early April, no notes were heard from the male. Just the one bird was seen all season.

36. WILSON'S SNIPE, *Gallinago delicata*. Common spring and fall.

37. KNOT, *Tringa canutus*. Two birds were found dead under telephone wires, about eight and one-half miles south. They are mounted and in the possession of Mr. Knolls, Delaware.

38. PECTORAL SANDPIPER, *Pisobia maculata*. One specimen in my collection taken by R. T. Hedley, at Duncrief, Ont., October 18, 1901.

39. LEAST SANDPIPER, *Pisobia minutella*. Commonest in late July and early August.

40. RED-BACKED SANDPIPER, *Pelidna alpina*. Two came to the pond, October 15, 1917. Secured one specimen. These are the only ones noted.

41. SEMI-PALMATED SANDPIPER, *Ereunetes pusillus*. Frequently seen with Least Sandpiper.

42. GREATER YELLOW-LEGS, *Totanus melanoleucus*. A few each spring. Quite common in the fall.

43. LESSER YELLOW-LEGS, *Totanus flavipes*. Not so regular as *melanoleucus*.

44. SOLITARY SANDPIPER, *Helodromas solitarius*. Irregular in spring, but always a few in August.

45. UPLAND PLOVER, *Bartramia longicauda*. Several pairs nest regularly in the large grass fields. W. R. Campbell, of Lobo, has a set of four taken in May, 1914. I have a set of four found on June 3, 1915. Both birds flushed hard from the nest; the one in June, 1915, did not leave until grass-tuft around the nest was touched (and these were fresh eggs). While searching for the last mentioned nest, two birds continually circled over the field giving their odd rattling notes. We thought at the time they were the pair from the nest but on finding a bird setting, concluded, there must have been two occu-

pied nests and that these were the two males—or the two birds off duty from the nests.

46. SPOTTED SANDPIPER, *Actitis macularia*. Common summer resident. An instance which might suggest that the number of eggs in a set is, perhaps, in a small measure voluntarily under control of the bird is the following: A pair of these birds were excavating the slight depression necessary for their nest; when they came to a stone practically the same size as an egg, they left this and built the nest around it, then laid three eggs which, with the stone, formed the perfect circle usual with the four eggs. I think if the stone had been removed at first, they would have laid the usual set of four, as I have never found a nest with other than four eggs.

47. BLACK-BELLIED PLOVER, *Squatarola squatarola*. Six were shot several years ago.

48. GOLDEN PLOVER, *Charadrius dominicus*. Two specimens in my collection taken by R. T. Hedley, at Duncrief, September 19, 1904.

49. KILLDEER, *Oxyechus vociferus*. Common summer resident.

50. SEMI-PALMATED PLOVER, *Aegialitis semipalmata*. Took one at Duncrief, July 29, 1918.

51. BOBWHITE, *Colinus virginianus*. Becoming exceedingly scarce; rarely seen now. A number of years ago they bred quite commonly.

52. RUFFED CROUSE, *Bonasa umbellus*. Quite scarce in the township now.

53. MOURNING DOVE, *Zenaidura macroura*. Very generally distributed. I have found fresh eggs from the last week in April until the third week in June.

54. TURKEY VULTURE, *Cathartes aura*. Three pair bred in the vicinity every year. Four nests noted were all in hollow logs. W. R. Campbell took a set of one, May 18, 1919; it was in a hollow of the rotten wood, about twelve feet from opening, very difficult to see from end of log. Egg far advanced.

55. MARSH HAWK, *Circus hudsonius*. Breeds here regularly. See more of the "blue" males than formerly.

56. SHARP-SKINNED HAWK, *Accipiter velox*. A few seen every spring and fall, but only occasionally in summer.

57. COOPER'S HAWK, *Accipiter cooperi*. Only one or two observed each season.

58. GOSHAWK, *Astur atricapillus*. Occasionally comes in late fall.

59. RED-TAILED HAWK, *Buteo borealis*. Is always common in breeding season, a pair or two often staying over winter. Then, they usually nest earlier. On March 30, 1914, a nest was found with three eggs. This pair was usually resident and laid at least a week earlier than the average migrating

bird. Twelve nests were noted near here in 1916.

60. RED-SHOULDERED HAWK, *Buteo lineatus*. The Red-shoulder seems to be locally distributed. It is very scarce in this part, while south and east a few miles it is commoner than the Red-tail. On May 10, 1901, C. G. Zavitz and I found a Great Blue Heron's nest containing three eggs and one Red-shouldered Hawk's egg, all equally incubated (far advanced). The Hawk doubtless had only laid one egg by the time the colony of Herons came and when it was driven out. I have found this Hawk to lay in a squirrel's nest of leaves, without adding any twigs or sticks, but never have heard of its having laid in other bird's nests.

61. BROAD-WINGED HAWK, *Buteo platypterus*. Quite abundant during migration. Very ordinary fare seems to satisfy these birds. I have found a Mole shrew, *Blarina brevicauda*, in the stomach of one specimen in the spring of 1919.

62. ROUGH-LEGGED HAWK, *Archibuteo lagopus*. Two or three are seen nearly every year.

63. BALD EAGLE, *Haliaeetus leucocephalus*. One or two seen nearly every year. A pair bred about eight miles south in the spring of 1919.

64. SPARROW HAWK, *Falco sparverius*. Regular summer resident. Although usually subsisting on small fare, I have seen them carry off an adult robin.

65. OSPREY, *Pandion haliaetus*. Usually one or two visit the pond each spring.

66. LONG-EARED OWL, *Asio wilsonianus*. A pair breeds always in one of the cedar swamps or woods each spring. I think their average date of finishing laying is about April 1, but the crows destroy the first set more often than not. The five sets noted, which escaped destruction by crows before completion, each contained five eggs; all were in old crow's nests, no repairs evidently being made. The eggs in the early sets are laid usually at intervals of several days, so the young birds are quite noticeably different in size, especially while in the natal down. One set taken, May 1, 1916, all eggs were uniformly incubated; they may have been laid unevenly (as the bird would not have to set until through laying this time of year) but I think not as I have never found a nest with an egg in it and the bird not setting close. They apparently are much like the Great Horns, nesting at the usual time regardless of the weather. One pair had two eggs on March 31, 1903, when there was four inches of snow on the ground.

In a nest found April 24, 1917, the young birds stayed in the nest three and a half weeks. The old birds were very bold. One would alight on a limb near the nest tree, flapping its wings, then fall, sometimes fifteen feet, to the ground, floundering about among the leaves as if wounded.

They seem to feed almost entirely on meadow voles and white-footed mice. In twenty disgorged pellets of fur and bones found under roost trees, 15 contained, each, skulls, etc. of two *M. pennsylvanicus*, 3, each, one *M. pennsylvanicus* and 2, each, one *M. pennsylvanicus* and one *P. leucopus*. When one bird is setting the other keeps a plentiful supply of mice; usually a mouse is lying on the edge of the nest.

67. SHORT-EARED OWL, *Asio flammeus*. Some autumns a few are seen, also, on through the winter.

68. SAW-WHET OWL, *Cryptoglaux acadia*. Rare only one specimen taken, November 2, 1913.

69. SCREECH OWL, *Otis asio*. Common resident.

70. GREAT HORNED OWL, *Bubo virginianus*. Several pair breed near here, laying the last week in February. On April 28, 1914, in climbing to a Great Blue Heron's nest, was surprised to find a young Horned Owl, nearly ready to fly. In a heron's nest a few rods over was another young owl. I tried this bird but it couldn't fly, so I presume the old bird must have moved the one to the second nest—perhaps when they became quarrelsome. Evidently the other nest was appropriated after the herons took possession, as a pair of herons were building a new nest; the other 21 were all occupied. The owls were nearly in the centre of the heronry. I took three specimens in the spring of 1918 which I think are a phase of *subarcticus*.

71. SNOWY OWL, *Nyctea nyctea*. Very seldom seen, more commonly appearing a few miles north.

72. YELLOW-BILLED CUCKOO, *Coccyzus americanus*. Common; breeds.

73. BLACK-BILLED CUCKOO, *Coccyzus erythrophthalmus*. Common; breeds.

74. BELTED KINGFISHER, *Ceryle alcyon*. Has stayed over winter.

75. HAIRY WOODPECKER, *Dryobates villosus*. *T. v. villosus* seems to be the common winter form.

76. DOWNY WOODPECKER, *Dryobates pubescens*. Is commoner than the Hairy woodpecker. Several present at all seasons.

77. ARCTIC THREE-TOED WOODPECKER, *Picoides arcticus*. W. R. Campbell took a male in 1913 and I a female, Nov. 20, 1918, the only two I have seen.

78. YELLOW-BELLIED SAPSUCKER, *Sphyrapicus varius*. Regular migrant.

79. PILEATED WOODPECKER, *Phocotomus pileatus*. Two pair nest regularly a few miles southwest of here. One dead beech stub has three nest-holes about three or four feet apart. The lowest forty-five feet from ground.

80. RED-HEADED WOODPECKER, *Melanerpes erythrocephalus*. Not nearly so common as formerly. Winters over in years the beech-nuts are

plentiful. They seem to nest earlier those years.

81. RED-BELLIED WOODPECKER, *Centurus carolinus*. A few pair resident; but used to be much more common. A nest May 7, 1913, contained two fresh eggs.

82. FLICKER, *Colaptes auratus*. Very common. An occasional bird staying through the winter.

83. WHIP-POOR-WILL, *Anthrostomos vociferus*. Quite regular, never very many.

84. NIGHTHAWK, *Chordeiles virginianus*. Always several pairs. Found a nest June 4, 1918, near edge of a small wood. The eggs were laid in the imprint of someone's heel in the earth, only one small leaf under eggs.

85. CHIMNEY SWIFT, *Chaetura pelagica*. They seem to build in silos, granaries, or in barns on the siding as often as in chimneys.

86. RUBY-THROATED HUMMINGBIRD, *Archilochus colubris*. Breeds. Is quite abundant along the borders of swamps when the spotted jewel-weed (*Impatiens biflora*) is in bloom.

87. KINGBIRD, *Tyrannus tyrannus*. Common; breeds.

88. CRESTED FLYCATCHER, *Myiarchus crinitus*. Fairly common; breeds.

89. PHOEBE, *Sayornis phoebe*. Very common; breeds.

90. OLIVE-SIDED FLYCATCHER, *Nuttallornis borealis*. Only three individuals seen.

91. WOOD PEWEE, *Myiochanes virens*. Common; breeds.

92. YELLOW-BELLIED FLYCATCHER, *Empidonax flaviventris*. Rare. One taken May 28, 1919.

93. ALDER FLYCATCHER, *Empidonax traillii*. Two *E. t. alnorum* taken May 10, 1918. Not more than one or two seen in the spring.

94. LEAST FLYCATCHER, *Empidonax minimus*. Common in migration. Only a very few seem to breed here.

95. PRAIRIE HORNED LARK, *Otocoris alpestris*. *O. a. praticola* is a common resident, raising two broods a season. It seems more abundant in winter owing to its being in flocks. Took an albino female June 11, 1917.

96. BLUE JAY, *Cyanocitta cristata*. Resident. They gather in the Cedar swamps in the late fall and eat large quantities of Skunk Cabbage (*Symplocarpus foetidus*) seeds.

97. CROW, *Corvus brachyrhynchos*. Abundant resident; sometimes rather scarce in winter. Their chief form of recreation seems to be making life miserable for the Horned Owls. Yet they prove an effectual body guard, when the owl is pursued with a gun, always getting him in motion in plenty of time.

98. BOBOLINK, *Dolichonyx oryzivorus*. Very common summer resident.

99. COWBIRD, *Molothrus ater*. Much too abundant. Most of the small birds are burdened with the rearing of it's offspring.

100. RED-WINGED BLACKBIRD, *Agelaius phoeniceus*. Breeds in most of the cat-tail runs, also building in the wild Red Osier, *Cornus stolonifera*, and sedge grasses.

101. MEADOWLARK, *Sturnella magna*. Common; breeds. Sometimes few stay over winter.

102. ORCHARD ORIOLE, *Icterus spurius*. One noted in song May 31, 1917.

103. BALTIMORE ORIOLE, *Icterus galbula*. Common, breeds.

104. RUSTY GRACLE, *Euphagus carolinus*. Common migrant. More abundant in fall.

105. BRONZED GRACLE, *Quiscalus quiscula*. Abundant summer resident. Occasional birds staying in winter. Is in rather poor grace with the farmers of this locality, through it's love for sprouting corn, yet I think they receive much more benefit than harm from the bird.

106. PINE GROSBEAK, *Pinicola enucleator*. A number were here through the winter of 1918-19. They seemed to feed largely on apple seeds.

107. PURPLE FINCH, *Carpodacus purpureus*. They seem to be great wanderers, as there are long stretches at a time through the winter when they are entirely absent.

108. CROSSBILL, *Loxia curvirostra*. Three seen Feb. 14, 1918.

109. WHITE-WINGED CROSSBILL, *Loxia leucopetala*. Saw six Nov. 18, 1917.

110. REDPOLL, *Acanthis linaria*. Some winters quite abundant, but usually only a very few seen, or entirely absent.

111. GOLDFINCH *Astragalinus tristis*. Abundant resident. Found commonest in winter on the Black Birch, *Betula lenta*. Feeds on the catkins.

112. PINE SISKIN, *Spinus pinus*. Occasional small flocks met with in fall.

113. SHOW BUNTING, *Plectrophenax nivalis*. Abundant winter visitor.

114. VESPER SPARROW, *Voocetes gramineus*. Very common; raising two and three broods a season.

115. SAVANNAH SPARROW, *Passerculus sandwichensis*. Common summer resident.

116. GRASSHOPPER SPARROW, *Ammodramus savannarum*. Regular summer visitor. Have heard them in song up to the last week in July.

117. WHITE-CROWNED SPARROW, *Zonotrichia leucophrys*. Always present in spring and fall migrations.

118. WHITE-THROATED SPARROW, *Zonotrichia albicollis*. Abundant in spring and fall. Have never observed it during the breeding season.

119. TREE SPARROW, *Spizella monticola*. Common winter resident; remaining until the second week in April

120. CHIPPING SPARROW, *Spizella passerina*. Very common; breeds.

121. FIELD SPARROW, *Spizella pusilla*. Very few here. Common four miles south-west.

122. SLATE-COLORED JUNCO, *Junco hyemalis*. Abundant in spring and fall; a very few remaining to breed. Always quite a number present through the winter.

123. SONG SPARROW, *Melospiza melodia*. Very abundant summer resident. A few spend the winter.

124. LINCOLN'S SPARROW, *Melospiza lincolni*. Saw three Oct. 3, 1917. Took one specimen. They did not skulk through the grass, as I had expected, but stayed in the low dog-wood bushes which margined the pond.

125. SWAMP SPARROW, *Melospiza georgiana*. Breeds sparingly here each season.

126. FOX SPARROW, *Passerella iliaca*. Five to ten seen each migration.

127. TOWHEE, *Pipilo erythrophthalmus*. Common. A few wintered here the season of 1917-18.

128. CARDINAL, *Cardinalis cardinalis*. One taken May 3, 1918. The first to be observed. Another heard July 8, 1918.

129. ROSE-BREASTED GROSBEAK, *Zamelodia ludoviciana*. Common; breeds.

130. INDIGO BUNTING, *Passerina cyanea*. A pair breeds in nearly every large raspberry patch.

131. SCARLET TANAGER, *Piranga erythromelas*. Common. Took a beautiful male June 3, 1918, half way between summer and winter plumage, yet it was full—no pin-feathers. The underparts were color of the female with heavy, clear-cut blotches of scarlet. Crown, nape and back, variegated with scarlet and green, darker than crown of female.

132. PURPLE MARTIN, *Progne subis*. Only one seen—June 1, 1918.

133. CLIFF SWALLOW, *Petrochelidon lunifrons*. Occasionally a colony attempts to build under the eaves of a barn, but are usually driven out by House Sparrows.

134. BARN SWALLOW, *Hirundo erythrogaster*. Common; breeds.

135. TREE SWALLOW, *Iridoprocne bicolor*. Regular migrant; few nesting.

136. BANK SWALLOW, *Riparia riparia*. A few breed in most of the gravel-pits. Larger colonies in the sand-banks along the creek.

137. ROUGH-WINGED SWALLOW, *Stelgidopteryx serripennis*. Becoming commoner. Several pair nest each season. Eggs are laid early in the second week in June. All nests I examined contained six eggs.

138. CEDAR WAXWING, *Bombycilla cedrorum*. Resident, but very uncertain in winter, sometimes not noted until spring.

139. NORTHERN SHRIKE, *Lanius borealis*. Usually one each fall or winter.

140. MIGRANT SHRIKE, *Lanius ludovicianus*. A pair or two always nested, but none seen near since 1918.

141. RED-EYED VIREO, *Vireosylva olivacea*. Common summer resident. Last spring (June 8, 1918) I noticed a Red-eye excited over something, then saw a chipmunk climbing the sapling the bird was in. When he was about eight feet up, the vireo darted down knocking him to the ground. The other bird was on the nest at the end of one of the branches. The nest contained four cowbird's eggs and one of their own, so little was gained in keeping the chipmunk away.

142. PHILADELPHIA VIREO, *Vireosylva philadelphia*. Appears sparingly early in the last week of May.

143. WARBLING VIREO, *Vireosylva gilva*. Three or four pair breed in the village every summer.

144. YELLOW-THROATED VIREO, *Lanivireo flavifrons*. A regular summer resident.

145. BLUE-HEADED VIREO, *Lanivireo solitarius*. Usually from one to six seen each spring and fall.

146. BLACK AND WHITE WARBLER, *Mniotilta varia*. Common migrant. Very seldom seen during nesting season.

147. GOLDEN-WINGED WARBLER, *Vermivora chrysoptera*. A pair regularly breeds near here, May 18, 1919, saw five.

148. NASHVILLE WARBLER, *Vermivora rubricapilla*. Never abundant. A few seen each spring.

149. ORANGE-CROWNED WARBLER, *Vermivora celata*. Only one positively identified, a male, May 9, 1918.

150. TENNESSEE WARBLER, *Vermivora peregrina*. Fairly well represented from May 15 to 25. Always a few in fall.

151. PARULA WARBLER, *Compsothlypis americana*. Have only observed it in spring.

152. CAPE MAY WARBLER, *Dendroica tigrina*. Arrives about May 6. Usually see from two to six each spring; one or two in the fall.

153. YELLOW WARBLER, *Dendroica aestiva*. Very common summer resident.

154. BLACK-THROATED BLUE WARBLER, *Dendroica caerulescens*. Common migrant spring and fall.

155. MYRTLE WARBLER, *Dendroica coronata*. Abundant migrant.

156. MAGNOLIA WARBLER, *Dendroica magnolia*. Common, spring and fall.

157. CERULEAN WARBLER, *Dendroica cerulea*. Arrives about May 13. Breeds in a number of nearby woods.

158. CHESTNUT-SIDED WARBLER, *Dendroica pensylvanica*. Very common during migration, but only a few remaining to breed. Found two pair building June 13, 1918.

159. BAY-BRESTED WARBLER, *Dendroica castanea*. Always quite a number in spring, the females arriving nearly a week later than the males. Have never taken it in autumn.

160. BLACK-POLL WARBLER, *Dendroica striata*. Regular, spring and fall, but in no great numbers.

161. BLACKBURNIAN WARBLER, *Dendroica fusca*. Very abundant migrant. Spring stay is about May 12-29.

162. BLACK-THROATED GREEN WARBLER, *Dendroica virens*. Very regular in spring and fall.

163. PALM WARBLER, *Dendroica palmarum*. Most common in fall. All specimens I have examined were *D. p. palmarum*.

164. PRAIRIE WARELER, *Dendroica discolor*. On the evening of May 20, 1919, C. H. Zavitz, of Coldstream told me of seeing a warbler in an orchard which he took to be the Prairie. I was on the ground at sunrise the next morning and secured a male, the only record for here.

165. OVENBIRD, *Seiurus aurocapillus*. Common; breeds in most of the woods.

166. WATER-THRUSH, *Seiurus noveboracensis*. Always a few each spring; have never heard them in June. May 8, 1917, I took a water-thrush which agrees perfectly in measurements and color with *S. n. notabilis*. My other skins fit *noveboracensis* fairly well.

167. CONNECTICUT WARBLER, *Oporornis agilis*. Usually see two or three each spring in the woods or mixed swamps.

168. MOURNING WARBLER, *Oporornis philadelphia*. Always several each spring, but usually only a pair stay to breed.

169. MARYLAND YELLOW-THROAT, *Geothlypis trichas*. Several pair breed.

170. YELLOW-BREASTED CHAT, *Icteria virens*. One taken here on May 14, 1918, by Hoyes Lloyd. The only record.

171. WILSON'S WARBLER, *Wilsonia pusilla*. Occurs sparingly as a migrant.

172. CANADA WARBLER, *Wilsonia canadensis*. Common migrant.

173. REDSTART, *Setophaga ruticilla*. Common during migration; quite a number breed.

174. PIPIT, *Anthus rubescens*. Occurs both spring and fall but very irregular; always in flocks.

175. CATBIRD, *Dumetella carolinensis*. Very common summer resident. W. R. Campbell records one as wintering season of 1918-19.

176. BROWN THRASHER, *Toxostoma rufum*. Common. Eggs laid about May 10.

177. CAROLINA WREN, *Thryothorus ludovicianus*. A male came in spring of 1916; was in full song until August.

178. HOUSE WREN, *Troglodytes aedon*. Very common; breeds nearly as often in old stumps in clearings as about farm-buildings.

179. WINTER WREN, *Nannus hiemalis*. Have only found it as a migrant in spring and fall; is fairly common.

180. SHORT-BILLED MARSH WREN, *Cistothorus stellaris*. Have observed it but twice locally; took a specimen Sept. 2, 1916; saw another June 5, 1917.

181. BROWN CREEPER, *Certhia familiaris*. Usually resident. Absent winter of 1918-19. There is usually one to be seen in a mixed flock of chickadees, nuthatches and downy-woodpeckers.

182. WHITE-BREASTED NUTHATCH, *Sitta carolinensis*. Common resident.

183. RED-BREASTED NUTHATCH, *Sitta canadensis*. Quite common in spring and fall of some years; during others nearly absent.

184. CHICKADEE, *Penthestes atricapillus*. Common resident; nesting early in May.

185. GOLDEN-CROWNED KINGLET, *Regulus satrapa*. Ordinarily fairly common all winter and

spring, but the last two winters (1917-18, 1918-19) entirely absent. Only one individual seen each spring.

186. RUBY-CROWNED KINGLET, *Regulus calendula*. Regular migrant.

187. BLUE-GRAY GNATCATCHER, *Poliopelia caerulea*. Rare; only two noted.

188. WOOD THRUSH, *Hylocichla mustelina*. Fairly common summer resident, breeding in most of the woods.

189. VEERY, *Hylocichla fuscescens*. Not as common as the woodthrush in the breeding season, but common during migration.

190. GRAY-CHEEKED THRUSH, *Hylocichla aliciae*. Rare migrant. Took a specimen May 13, 1918; saw one May 14, 1919.

191. OLIVE-BACKED THRUSH, *Hylocichla ustulata*. Common spring and autumn migrant.

192. HERMIT THRUSH, *Hylocichla guttata*. Appears in numbers both spring and fall.

193. ROBIN, *Planesticus migratorius*. Very abundant, occasional birds staying through the winter. The spring of 1915, two albinos hatched from a nest at Lobo (five miles east). One was practically white, the other had a dark head. The white one became quite tame, as food was put out for it daily. It returned the next spring, but soon disappeared, probably taken by a cat.

194. BLUEBIRD, *Sialia sialis*. Very commonly distributed. Oct. 12, 1914, I took an albino from a large flock. It is pure white with a little dusky shade on wings and tail, crown, nape and back showing very pale blue.

THREE NEW PELECYPODS FROM THE COLORADOAN OF THE PEACE AND SMOKY VALLEYS, ALBERTA*

BY F. H. McLEARN.

The revised stratigraphy of the Cretaceous of northern Alberta is treated in recent reports of the Geological Survey of Canada.¹ To them the reader is referred for detailed lithological and structural

descriptions, thicknesses, areal distribution, correlation, correlation table, faunal lists, and description of new species. A statement of the principal facts concerning the Coloradoan of the Peace and Smoky Valleys is given below and is followed by the description of three new species of pelecypods. Thanks are due to Dr. T. W. Stanton for aid in the study of the fossils.

FORMATIONS. The Colorado group of the Peace and Smoky valleys includes, in ascending order, the St. John and Dunvegan formations and the lower shale and Bad Heart sandstone members of the Smoky River formation (the age of the lower 100 feet of the upper shale member may be either Coloradoan or Montanan). The St. John consists

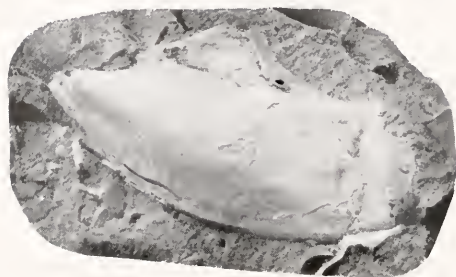
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1. McLearn, F. H., Peace River Section, Alberta, Geol. Surv., Can., Summ. Rep., 1917, C., pp. 14C-21C.

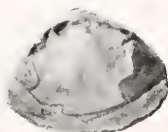
McLearn, F. H., The Cretaceous of Peace and Athabaska Valleys, in Dowling, Slipper & McLearn, Investigations in the Gas and Oil fields Alberta, Saskatchewan and Manitoba. Geol. Surv., Can., Mem. No. 116, Part III, pp. 27-33.

McLearn, F. H., Cretaceous Lower Smoky River, Alberta, Geol. Surv., Can., Summ. Rep. 1918, C., pp. 1C-7C.

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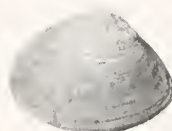
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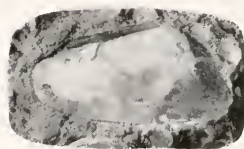
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of marine dark shale. The Dunvegan is composed of sandstone and shale; the presence of some marine shells demonstrates temporary marine conditions, but the internal structure and nonmarine fossils indicate predominantly subaerial deposition. The Smoky River is made up chiefly of marine shale, with a marine sandstone band (Bad Heart sandstone) at or near the top of the Colorado part of the formation.

DUNVEGAN DELTA. The subaerial character of the Dunvegan and its conformable relation to marine beds above and below identify it as a delta built out into the Colorado sea. The thinning of sandstone and its replacement by shale in an easterly direction points to a western source of sediment and the existence of high land there; it also indicates that the delta was built out from the western shore. It extended at least as far east as the Athabaska in the Pelican-House River area. Southward it is not thought to have reached far, but until the Colorado group of the Brazeau-Bighorn area is studied in detail the southerly limit cannot be determined.

ZONAL ARRANGEMENT. Four fossil zones are recognized in the local development of the Colorado group. The St. John contains the first fauna with *Acanthoceras cornutum* Whiteaves, large *Inoceramus*, etc.; it may be quite early Coloradoan. A part of the base of the St. John may represent a marine equivalent of the Dakota. The second or Dunvegan fauna contains, as guide fossils, *Unio dowlingi* McLearn, *Corbula pyriformis* Meek, *Brachydontes multilinigera* Meek, *Ostrea anomioides* Meek, and *Barbatia micronema* (Meek.) The third fauna is found in the lower part of the lower shale member of the Smoky River and includes *Prionotropis hyatti* Stanton, *Acanthoceras* cf. *coloradoensis* Henderson and *Inoceramus labiatus* Schlotheim. The difference between the second and third faunas can be explained by dissimilar environmental conditions; for the Dunvegan contains freshwater, brackish water and marine sand bottom forms, while the basal Smoky River represents a shale facies with also ammonites. For the purpose of correlation they may be treated as one fauna. The fourth and highest zone, at the top of the lower shale member and in the Bad Heart sandstone member of the Smoky River, contains *Scaphites ventricosus* M. & H., *Baculites* cf. *asper* Morton, *B.* cf. *anceps* Lamarck, *Inoceramus umbonatus* M. & H., *Oxytoma nebrascana* E. & S. and *Pteria linguiformis* E. & S.

NEW SPECIES. Of the three species described below two are from the Dunvegan formation:

Tellina dunveganensis, n.sp.

Tellina (Moera) peaceriverensis, n.sp.

One is from the Bad Heart sandstone:—

Gervillia stantoni, n.sp.

Phylum MOLLUSCA.

Class PELECYPODA Goldfuss.

Order PRIONDESMACEA Dall.

Family PERNIDAE Zittel.

Genus GERVILLIA DeFrance.

Gervillia stantoni, n. sp. FIG. 1.

This species is smaller and less oblique in outline than *Gervillia recta* var. *borealis* Whiteaves and *G. subtortuosa* Meek and Hayden. The size is about as in *G. recta* Meek and Hayden, but it is not nearly so oblique in outline and is wider proportionately on the hinge line.

The species name is given in honour of Doctor T. W. Stanton of the U. S. Geological Survey.

Height 40 m.m.; length 42 m.m.; length of hinge; line 35 m. m.

Horizon and Locality. Rare in the Bad Heart sandstone member of the Smoky River formation, Smoky river, Alberta.

Collection. Holotype Cat. No. 5669 in the Victoria Memorial Museum, Ottawa.

Order TELEODESMACEA Dall.

Family TELLINIDAE Deshayes.

Genus TELLINA Linné.

Tellina dunveganensis, n. sp. FIGS. 2, 4.

A trigonal, moderately depressed, shell with sub-central beaks and somewhat angular post-umbonal slope. External ligament very short; pallial sinus rounded and shallow; lateral teeth well developed and the anterior one approximate; two stout cardinal teeth in the left valve.

Height 18 m. m.; length 25 m. m.

Horizon and Locality. Rather rare in the Dunvegan formation, Peace and Smoky rivers, Alberta.

Collection. Holotype Cat. No. 5671 in the Victoria Memorial Museum, Ottawa.

Tellina (Moera) peaceriverensis, n. sp. FIGS. 5, 6.

Only molds of the left valve are preserved. The outline resembles that of *Donax cuneata* Stanton, but this species is not so abruptly deflected on the postumbonal slope, is not curved upward at the anterior end, and the beak is not so prominent or terminal. *Donax? oblonga* Stanton is a larger shell with more prominent beak and is more angular and abruptly deflected on the post-umbonal slope.

The form of this species suggests the genus *Donax*; but the dentition is like *Tellina* and the outline is closest to subgenus *Moera*. The left valve has two cardinal teeth, the posterior much smaller than the anterior. The lateral teeth are too well developed for *Donax*; the anterior lateral is approximate as in *Tellina*. Ligament not known.

The pallial sinus is shallow.

Height 15 m. m.; length 30 m. m.

Horizon and Locality. Rare in the Dunvegan formation, Peace river, Alberta.

Collection. Holotype Cat. No. 5670, cast of holotype No. 5670a, in the Victoria Memorial Museum, Ottawa.

EXPLANATION OF PLATE.

Figure 1.—*Gervillia stantoni* McLearn n. sp. Mold of interior of left valve. Geol. Surv., Can., Mus. No. 5669, holotype.

Figure 2.—*Tellina dunveganensis* McLearn n. sp. Largely exfoliated left valve, revealing mold of interior and showing muscle scars, pallial line and pallial sinus. Geol. Surv., Can., Mus. No. 5671, holotype.

Figure 3.—The same specimen. Shows dorsal view of both valves, with external ligament.

Figure 4.—The same specimen. Right valve.

Figure 5.—*Tellina (Moera) peacriverensis* McLearn n. sp. Left valve, shell exfoliated, revealing mold of interior and showing muscle scars, pallial line and pallial sinus. Geol. Surv., Can., Mus. No. 5670, holotype.

Figure 6.—The same. Cast of part of left valve, showing hinge. Geol. Surv., Can., Mus. No. 5670a, cast of holotype.

Figure 7.—Smoky river at mouth of Bad Heart river. Cliff of Smoky River shale with band of Bad Heart sandstone.

OBITUARY.

LAWRENCE M. LAMBE.

By the death of Lawrence Lambe, which occurred on March 12th, 1919, the Canadian Geological Survey lost one of its best known scientists. Mr. Lambe was the Vertebrate Palaeontologist of the Geological Survey of Canada.

Lawrence M. Lambe was born in Montreal, on August 27th, 1863. His father, Wm. B. Lambe, was an Englishman who came to Canada when a young man. His mother was of Scotch descent, the daughter of Hon. Wm. Morris, of Montreal.

Lambe's college training was taken with a view to entering the profession of civil engineer. He secured shortly after his graduation from college a position with the engineers of the mountain division of the C. P. R. It is most probable that he would have remained a civil engineer but for the fact that an attack of typhoid fever compelled his return home. Although offered, after his recovery, another position on the engineering staff of the C.P.R. he preferred an appointment to the Canadian Geological Survey.

Much of Mr. Lambe's training in zoology and palaeontology was acquired chiefly through his association with that keen naturalist and palaeontologist, Dr. J. F. Whiteaves. This association began when Lambe, at the age of twenty-two, received his first appointment to the Canadian Geological Survey as artist and assistant to Dr. Whiteaves. At a considerably later period he studied with Dr. H. F. Osborne at Columbia University. Concerning this period of Mr. Lambe's career, Dr. Osborne writes as follows:—

"When I was appointed in April, 1900, on the Geological Survey of Canada, as palaeontologist,

to succeed Professor Edward D. Cope, I chose Mr. Lawrence M. Lambe as my chief associate and I immediately engaged with him in the study of the fauna of the Belly River, which was published in 1902 (see Osborn *Bibliography* 1902. 217). He afterward came to Columbia University and took my full course in vertebrate palaeontology."

Analysis of Lambe's publications shows three distinct stages in his development as a scientific worker. His first three papers dealt with living marine sponges. His contributions to zoology all relate to sponges and extend over a period of thirteen years, beginning in 1892. His first contribution to invertebrate palaeontology appeared in 1896, four years after he had begun publishing on sponges. Two years later his first paper on vertebrate fossils was published. His papers published since 1900 relate with few exceptions to vertebrate palaeontology, the subject with which his name in recent years has been chiefly associated. Lambe's most important work on invertebrate fossils relates to the corals. For a short period after the death of Dr. J. F. Whiteaves, the determination of all of the palaeontological collections of the Canadian Geological Survey fell to Mr. Lambe,—a task which few palaeontologists could have ventured to undertake. After 1910, Lambe was able to devote his energies exclusively to vertebrate palaeontology. He had, too, during the later part of his career the good fortune to have the assistance of the Sternbergs who collected for him a wealth of dinosaurs and other material from the Alberta Cretaceous.

Lambe's interest centered in the office elaboration and description rather than in the collection of fos-

sils. Being an accomplished artist, he took the greatest care in supervising the execution of the drawings which illustrated the remarkable series of fossils which he has described during the last eight years. Among these were the first specimens of horned dinosaurs which had ever been found showing the character of the skin. The vertebrate fauna described by Lambe included many enormous heavy boned reptilian creatures of most fantastic appearance. One of these which bears the name of *Styracosaurus albertensis* possessed a skull six feet in length. The top of the skull extended backward from the great hooked mandibles, expanded like a shield over the neck where it was bordered by six powerful horns projecting from its posterior margin.

Among the important papers which he prepared in recent years were those describing the Triassic fishes of the Rocky Mountains. We are also indebted to him for important contributions to our knowledge of the Devonian fishes of New Brunswick. But it is with the wonderfully rich and varied vertebrate fauna of the Red Deer River valley of Alberta collected by the Sternbergs that

Lambe was chiefly occupied in recent years. His various papers dealing with the Cretaceous faunas of the west show admirable illustrations of many of these bizarre creatures of the Canadian Cretaceous. Several new genera were described from the Alberta material.

A complete list of the papers of Lawrence Lambe will be published in an early number of the Bulletin of the Geological Society of America.

Mr. Lambe was elected a Fellow of the Royal Society of Canada in 1901, and was a member of various other scientific societies.

Lawrence Lambe belonged to that small group of men who find in their work their greatest pleasure. Palaeontological work was to him indeed a labour of love. The little worries of life seemed never to penetrate his optimistic temperament. His friends will long remember the cheery smile and kindly word with which he always greeted them. Lambe accomplished much toward revealing Canada's early vertebrate life, and wherever such knowledge is cherished his passing will be deeply regretted.

E. M. KINDLE.

WALTER R. BILLINGS.

Through the death of Walter R. Billings, Canada has lost a citizen of unusual attainments. His death occurred on March 1st, in his 71st year at his home in Ottawa. Mr. Billings was an architect by profession and a palaeontologist by natural taste and inclination. Although palaeontology was an avocation with Mr. Billings which he actively followed during only a portion of his mature life, the work which he has left forms a substantial and valuable contribution to the science.

The ancestry of Walter R. Billings on the paternal side was rather complex including Welsh, English, Scotch and Irish elements. The family seemed to have, as tersely stated by Chas. Billings, "nearly the whole British Empire" at their backs. The grandfather of Walter R. Billings was born in Massachusetts; the grandmother in New York. Braddish Billings, grandfather of Walter, was the first white settler in Ottawa. The grandparents of Walter came to Ottawa when there was nothing to suggest the future city of Ottawa which developed later over a part of the 1000 acre tract of land which they acquired. The mother of Walter Billings was a daughter of Capt. Walter Ross. Walter R. Billings was a nephew of Elkanah Billings the distinguished first palaeontologist of the Canadian Geological Survey. To palaeontologists the death of the nephew will recall the birthday of palaeontological science in Canada, which may be said to coincide with the publication of Elkanah Billings' first paper on the Cystidea. To this able and

remarkable man Canadian naturalists owe a debt of gratitude for starting at his own expense the first magazine devoted to natural history published in Canada. The eloquent declaration of E. Billings in a letter to Sir Wm. Logan at the time of sending him the first copy of the Canadian Naturalist and Geologist, is worth recording here as evidence of the fine courage and enthusiasm which dominated the father of Canadian palaeontology. To Sir William he wrote, "I have abandoned my profession, (journalism) and intend to devote the rest of my life to the study of natural history." One purpose of the new magazine he stated in this letter was to arouse "if possible the youth of this country to pursuits for which they have everywhere most unrivalled facilities."

With such a sponsor in E. Billings it is small wonder that palaeontology made a strong appeal to the subject of this sketch. Inspired no doubt by the work of his uncle, Walter R. Billings became an ardent collector of fossils. That his collections came to include many rare and beautifully preserved specimens is sufficiently attested by the published references of foreign palaeontologists to them. Dr. Bather of the British Museum has referred in various papers to specimens collected by W. R. Billings. The generous spirit of Billings led him to loan his collections freely to those prepared to make use of them and some of his rarest specimens were presented to the British Museum.

His own published studies were confined chiefly to the Crinoidea. He is known to students of the Crinoidea for his valuable work on the Trenton crinoidal fauna of Ontario. Walter R. Billings during the period from 1881 to 1887 described in the Transactions of the Ottawa Field-Naturalists' Club, several new species and one new genus from Ottawa and Belleville.

During this period Billings took an active part in the excursions of the Ottawa Field-Naturalists' Club sharing the leadership of field parties with such naturalists as James Fletcher, J. F. Whiteaves, W. R. Ellis and H. M. Ami.

Many important additions to the knowledge of the Crinoidea have been made by Dr. Bather from studies of material collected by W. R. Billings. The very valuable collection of fossils left by Mr. Billings has been presented to the Canadian Geological Survey by his sister, Miss Myra, in accordance with his wishes. Besides the crinoids described by Billings, it includes much valuable material from other groups of fossils and many specimens from other countries.

Billings was always ready to place at the disposal of visiting geologists his intimate knowledge of collecting localities in the Ottawa district. Many geologists have been indebted to him for guidance to the interesting localities for collecting near Ottawa.

Palaeontology was as already stated an avocation with Walter R. Billings. He represented a type of man far too rare in Canada but more common in England, who finds the time and shows the ability to make worthy contributions to pure science while following a profession in no way allied to the science in which he delves.

Walter Billings was a man of broad interests and for many years took a keen interest in athletics. In his younger days he took an active part in the water sports for which Ottawa is noted. Many of his vacations were spent on his luxuriously furnished house boat.

The palaeontological studies of Walter R. Billings had enabled him to "peer far back into the night of time" but he claimed no such insight into the future as the great majority of men believe they have. His keen analytical mind had given him little if any knowledge of the uncharted seas of the Great Beyond. He was too frank and honest a man to lay claim to knowledge or beliefs which he had never acquired. It was therefore in deference to his modest views regarding the limitations of the human mind that the ceremonies usually observed, were omitted at the passing of Walter R. Billings. In his request that his remains be cremated we glimpse the fact that his concern was more for the welfare of those he left behind than for himself.

E. M. KINDLE.

BOOK NOTICES AND REVIEWS.

The library of McGill University has been enriched by a collection of text books, monographs, and sets of periodicals (in English, French, Italian and German) devoted to birds; constituting the Emma Shearer Wood Library of Ornithology. This library, the gift of Colonel Casey A. Wood of Chicago, to his Alma Mater, will be endowed by the donor, and is intended to serve not only as a reference collection for the use of college students and research workers but it will be available, so far as its more popular books are concerned, to readers, interested in birds, outside the University precincts.

It may be added that Dr. Casey Wood is an old Ottawa boy, having graduated as prizeman from the Collegiate Institute about 1875. He visited the Capital in 1918 as representative of the Surveyor General of the U. S. Army on a tour of inspection of our hospitals and other institutions engaged in the rehabilitation of our disabled soldiers. Col. Wood has retired from practice and is now engaged, in California, on the Medical and Surgical (Ameri-

can) History of the War and other literary tasks. He was the Secretary of the Committee that published the Anniversary Volumes dedicated to the late Sir William Osler.

In 1917, just before Dr. Wood took up his military duties he published his *Fundus Oculi of Birds*. This is an important study of a neglected subject. It is profusely illustrated with a wealth of coloured plates and line drawings and is a most valuable addition to avian anatomy in general and bird optics in particular. It also offers suggestions that may be of great value in the classification of birds.

NOTES ON SOME OF THE MORE COMMON ANIMALS AND BIRDS OF THE CANADIAN ROCKIES. By William Spreadborough. *Canadian Alpine Journal*, Vol. X., 1919, pp. 51-68. Mr. Spreadborough, the veteran naturalist and field collector, who has spent nearly every summer for the past thirty years with field parties of the Geological Survey of Canada, accompanying Mr. James McEvoy, Professor John Macoun, and the late Mr. James M. Macoun,

relates some of his interesting field experiences. Of mammals, he gives notes on grizzly bear, hoary marmot, Columbian ground squirrel, little chief hare, bushy-tailed woodrat or pack-rat, mountain flying squirrel, and Hudson Bay red squirrel.

Of birds, he gives many interesting notes on the habits of Richardson's grouse, grey ruffed grouse, Franklin's grouse or fool-hen, white-tailed ptarmigan, and golden eagle. Though he has written little, Mr. Spreadborough has a keen eye and ear for natural history work, and his wide journeyings into some of the most inaccessible parts of Canada have given him a wide knowledge of the habits of beasts and birds. It is to be hoped that he will put more of his observations on record.

R. M. ANDERSON.

MIGRATIONS OF THE GRAY SQUIRREL (*Sciurus carolinensis*). By Ernest Thompson Seton. *Journal of Mammalogy*, Vol. I., No. 2, February, 1920, pp. 53-58. Mr. Seton quotes from early accounts of "incredible" migrations before the eastern wooded area was thickly settled. Robert Kennicott records a migration from Canada across the Niagara River into western New York. As corroboration of the high figures given by the old naturalists, from which may be deduced a gray squirrel population of several billions at one time in the area inhabited by the species in 1800, Mr. Seton states that recently it was necessary to thin out the gray squirrels in the protected area of Central Park, New York, and 300 were shot without making much perceptible difference. That is, there were over 1000 to the 300 acres of timber. "In my recollection of a squirrel woods in Ontario, 1887, the numbers in Central Park are not to be compared to those in the northern woods. They were at least three times as numerous in the latter and yet we knew that there were about three to the acre in the park."

Mr. Seton asks young naturalists to render service now by interviewing all available old-timers who hunted squirrels in the 60's, and make a record of the time, place, extent, direction, etc., of every emigration that can be traced, together with facts that bear upon the causes and results or that in any way offer interesting light.

R. M. ANDERSON.

The Condor, Vol. XXI., ending Dec., 1919. During the past year there has appeared in this publication the following papers and articles of interest to Canadian readers:

P. 42, Sapsuckers and Hummingbirds, a short note by H. H. Mitchell, Provincial Museum, Regina, Sask. In this is described the visits of at least seven Ruby-throated Hummingbirds that successive-

ly came to drink sap flowing from the drilling made by a Yellow-bellied Sapsucker in a birch tree.

Pp. 57-60. Notes on the Breeding Habits of the Red Crossbill in the Okanagan Valley, British Columbia, by J. A. Munro, Okanagan Landing, B.C. This is an interesting paper on a little known subject. The author states that he secured specimens "which plainly show reversion from the yellow plumage to the red," thus giving evidence supporting the much disputed view that the red plumage is not the livery of the most mature birds.

Pp. 80-86. The Summer Birds of Hazelton, British Columbia, by P. A. Taverner, Geological Survey, Ottawa. This is an annotated list of 69 species noted or collected, in the summer of 1917, at Hazelton, on the Grand Trunk Pacific at its most northern point in British Columbia, by Wm. Spreadborough and the author.

Pp. 91-92. Letter by Mr. A. B. Howell, continuing the discussion started by Mr. Taverner's use of binomials.

P. 124. Mr. J. H. Fleming, of Toronto, has a note giving measurements and descriptions of Trumpeter Swans from California, the St. Clair Flats, Mich., and the State of Washington. Mainly details of a specimen in the British Museum, supplementary to its citation in *The Game Birds of California*.

Pp. 175. Editorial notice of the departure—May 14th, of a zoological collecting expedition from the Museum of Vertebrate Zoology, University of California, into Alaska and British Columbia, entering in the vicinity of Wrangell to proceed up the Stikine River to the neighborhood of Telegraph Creek. The party was composed of Mr. Harry S. Swarth, Curator of Birds in the museum and Mr. Joseph Dixon, Economic Mammalogist, and local assistants. It may here be noted that they returned in October with a large collection of important material. The expedition and the report that is planned to be published on its results was made possible through the financial interest of Miss Annie Alexander who has done so much to further zoological investigation on the Alaskan and British Columbian coast. It is well recognized in California, more perhaps, than anywhere else in this country that it is impossible to truly understand local zoological problems without studying adjacent extralimital territory.

Pp. 222-225. Bird Notes from Saskatchewan, by Mr. H. H. Mitchell, with three photographic illustrations. This consists of annotations on several species of birds. Brewer's Sparrow was found in some numbers in the valley of the Frenchman river, taken June 16, 1919, and fairly common between Eastend and Ravenscrag. Specimens identi-

fied by J. H. Fleming. The White-crowned Sparrow, the eastern form, breeding June 18, 1919, near Eastend. It has been previously been reported from the Cypress Hills by A. C. Bent and Wm. Spreadborough apparently breeding but without definite substantiation. The Chipping Sparrow is reported as breeding in the Cypress Hills but is declared to be "not common in any part of the province." The breeding form of the Horned Lark in the Cypress Hills is declared to be the Desert Horned Lark, *Otocoris alpestris leucolaema*. It is not evident from the context whether Mr. Mitchell regards Mr. Oberholser's *Enthemia* as a separable race which would be the expected form if it is. The Whip-poor-will was heard near the juncture of the North and South Saskatchewan rivers, about thirty miles east of Prince Albert, on July 15, 1919. This forms the first record for the province and the farthest west for Canada. Whether there is any likelihood that one familiar with the call of the Whip-poor-will of the East could mistake that of the Poor-will, can best be judged by those who are

acquainted with both. Either species would be important.

P. 239. An amusing reason for the elimination of the subspecies is reported by J. H. Fleming from the suggestion of the editors of the London Catalogue of British Plants, third edition, who oppose plant splitting on the grounds that it would make the catalogue unduly bulky and raise the postage on it beyond the limits of a blue (two penny) stamp.

P. 240. In a short note we are informed that Mr. Geo. Willet has established himself on Prince of Wales Island, Alaska, for the winter and expects to devote practically his entire time to ornithology. Prince of Wales Island is on the Pacific Coast just across Dixon Channel from the Queen Charlotte Islands and hence so close to British Columbian waters as to be of great interest to Canadian ornithologists. Information of this coast is not very complete and there is probably no place on the continent where a winter's work could be put in to better scientific advantage.

P. A. TAVERNER.

NOTES AND OBSERVATIONS.

A CANADIAN NATIONAL MUSEUM.—The following is a copy of a resolution passed by the Council of The Ottawa Field-Naturalists' Club, on March 12, 1920.

"Whereas all important civilized nations have found it desirable and necessary to establish national museums as storehouses and repositories for historic artistic and scientific treasures, safe from the ravages of time or accident, or the exploitation or caprice of private ownership, and where they will be available for the study or contemplation of the whole nation rather than of the favored few, and

"Whereas Canada has at this time no such national museum definitely established as such,—

"Be it resolved that the Council of The Ottawa Field-Naturalists' Club recommends that for the purpose of the safe-keeping of specimens of national importance, as an aid to and encouragement of Canadian scientists, to act as a general clearing house of scientific endeavors, for the general education of the public and as a monument to Canada's intellectual life, the present museum organizations under the Federal Government of Canada be re-established as a Canadian National Museum. And, further, that the Council urge upon Parliament that steps be immediately taken to establish such a museum as will worthily and creditably represent the Dominion amongst like institutions of the world. And further,

that a copy of this resolution be given to the press, and also published in *The Canadian Field-Naturalist*."

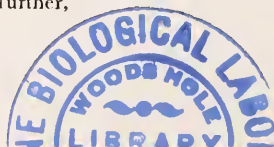
"PRAIRIE" FRINGED ORCHID. Mr. F. Morris, 643 Aylmer St., Peterboro, would be glad to hear from any reader of the NATURALIST who knows of a station in Ontario for the so-called "Prairie" Fringed Orchid (*Habenaria leucophaca*). It was found by him on the margin of a mud lake near Smith's Falls some 20 years ago, and in the moist heart of a tamarac swamp near Port Hope, 10 years ago, growing in Sphagnum moss with pogonias and cranberry vines close to standing water and cat-tails. It is a tall handsome plant with large creamy white flowers having a three-parted lip of fanlike and fringed divisions and a very long curving spur; the plants stand from 2 to 3½ feet high."

THE PROVINCE OF QUEBEC SOCIETY FOR THE PROTECTION OF BIRDS, MONTREAL, recently held meetings as follows:—

Jan. 12. Annual Meeting—Report—Election of Officers. Address: Mr. Napier Smith.

Feb. 9. The Traditions and Superstitions of Birds and Insects. Speakers, Miss M. Hadrill and Mr. A. F. Winn.

G. M. Dyer, Hon. Corres. Secy.





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NOTES ON THE MAMMALS OF RIDOUT, DISTRICT OF SUDBURY, ONTARIO.

BY J. DEWEY SOPER.

The comparative isolation of much of Northern Ontario from centres of habitation, seems a reasonable cause for the relative dearth of literature on the mammals from this region. The smaller species have, naturally, received little attention, and much is yet to be known about them, notably in regard to their range and life histories. Big game hunting and the fur-trade have doubtless conduced to a greater familiarity with the larger mammals than would otherwise have been the case. So far as is known the Ridout country has had no detailed investigation of its animal life; because of this fact the present paper based upon a collection of 55 mammals and observations thereon made in the immediate vicinity of Ridout is presented.

The first visit to the locality was from October 20 to November 2, 1917, efforts being mainly directed to the accumulation of notes on the larger mammals and birds of that period. With the present paper in view a return was made the following year, from October 1 to November 1, with every provision for the collection of specimens in order to round out the data as fully as possible.

The Jumping Mice (*Zapus hudsonicus* and *insignis*) were not secured, due partly to their early habit of hibernation. No bats were observed, nor Flying Squirrels (*Sciuropterus sabrinus*). No signs were seen of the Star-nosed Mole (*Condylura cristata*). Various circumstances prevent the list from being complete.

Ridout is situated on the Canadian Pacific Railway, 132 miles north-west of Sudbury, 166 miles south-east of White River, 96 miles north of Lake Huron and 280 miles south-west of James Bay. It is located upon the northern height of land at an elevation of 1,364 feet above the sea and 778 feet above Lake Superior. The surrounding hills range in altitude from 1,400 feet to probably 2,000 feet. Magnetic variation is about six degrees west of astronomical north.

The whole region is intersected by hundreds of streams and dotted with countless lakes of all sizes. Many feeders of that noble stream, the Moose River,

find their source along the height of land, converging fan-like to the majestic tide that sweeps northward to James Bay. Others, notably the Spanish River, flow southward to the Great Lakes.

The general character of the country about Ridout is that of vast rolling forested hills with frequent outcrops of gneiss or perhaps schist and greenstone. Some distance to the east, however, the region is broken into gigantic rock masses, mountains, and escarpments of desolate and infinite grandeur. The whole lies to-day as through all the ages.

Ridout lies well within the Canadian zone and in floral aspect resembles broadly that of all timbered sections west of Sudbury. Occasional boreal "islands" suggest the stunted evergreen forests of the Hudsonian zone. Conifers are everywhere predominant, the greater portion of the woods consisting of White and Black Spruce (*Picea canadensis* and *mariana*), Balsam Fir, (*Abies balsamea*) and Banksian or Jack Pine, (*Pinus banksiana*). Yellow and Canoe or White Birch (*Betula lutea* and *papyrifera*) occur, the latter especially being common and growing frequently in pure stands upon the side-hills. White and Red Pine (*Pinus strobus* and *resinosa*) flourish in varying numbers. The remaining common trees of the forest are Hemlock (*Tsuga canadensis*), Tamarack (*Larix laricina*), White Cedar (*Tsuga occidentalis*), Aspen Poplar (*Populus tremuloides*), Balsam Poplar (*Populus balsamifera*) occurring on low ground along lakes and streams, Alder (*Alnus incana*) and the Mountain Maple (*Acer spicatum*). *Salix rostrata* is the only tree-like willow. Blueberries are usually an abundant crop, and numerous flowers, particularly the wild rose, I understand, grow in great profusion during the northern summer. Mosses and lichens occur almost everywhere on rocks, logs, ground and upon the branches of standing trees.

The avifauna of the region for October while inextensive will convey certain impressions in a brief list, impossible to other things. Birds noted

during the first week of the month were Robin (*Planesticus m. migratorius*), Crow (*Corvus brachyrhynchus*); Raven (*Corvus corax principalis*); Canada Jay (*Perisoreus canadensis*); Blue Jay (*Cyanocitta cristata*); White-throated Sparrow (*Zonotrichia albicollis*); Great Blue Heron (*Ardea herodias*); Black-capped Chickadee (*Penthestes atricapillus*); Slate-colored Junco (*Junco hyemalis*); Horned Lark (*Otocoris alpestris*) and Rusty Blackbird (*Euphagus carolinus*). On October 10, a Kingfisher (*Ceryle alcyon*) and Pileated Woodpecker (*Ceophloeus pileatus abieticola*) were observed, the latter again on the 21st. One Tree Sparrow (*Spizella monticola*) was noted on the morning of October 13. During the afternoon of the 18th, Pine Grosbeaks (*Pinicola enucleator leucura*) were common. The first small flock of Snow Buntings (*Passerina nivalis*) made their appearance the following day. A single Arctic Three-toed Woodpecker (*Picoides arcticus*) was observed on Oct. 21. Ruffed Grouse (*Bonasa umbellus*) was noted but not commonly.

In the preparation of this article I have received many courtesies from Mr. W. E. Saunders, of London, Ont., and Dr. R. M. Anderson of the Geological Survey, Ottawa. The late Mr. James M. Macoun also of the Geological Survey, kindly furnished the proper common and scientific names of the trees known to occur in the region. To Mr. George Visser, of Ridout, I am indebted for many favors extended during the trip.

COMMON EASTERN SHREW, COOPER SHREW, OR MASKED SHREW, *Sorex personatus personatus* I. Geoffroy.

The masked shrew is very common at Ridout, persisting in nearly all situations from low woods and meadows to the wooded ridges.

Nine specimens were taken. Color.—Dorsal surface of the body brownish-gray, the latter barely perceptible; brown deeper on the rump. Sides slightly lighter. Belly, throat and chin ashy-gray, no sharp line of demarcation between color of belly and sides but change taking place rather abruptly. Tail obscurely bicolor, brownish above, paler below. Feet very light brown.

RICHARDSON'S SHREW, *Sorex richardsonii* Bachman.

Only three specimens of this beautiful shrew were collected at Ridout. A fourth was found dead on a trail through the woods but was beyond the stage for proper preservation. One of the three preserved was found lying dead on a trail intersecting a low meadow. No marks of violence were found on either of these animals but probably the pounce of a cat or bird would be sufficient to extinguish life, the aggressor leaving it unutilized when discover-

ing by the unsavory odor of its prey (which characterizes the shrews) the reality of its mistake. Few animals, I believe, devour the shrews on this account, and I have seen dogs that were very reluctant to even kill them for the same reason.

One man whom I talked with in the north firmly believed that every Richardson's shrew that crossed a human trail fell dead instantly; the idea doubtless originating from the appearance of numerous shrews in these places. The two which I found in the traps were in low damp meadows frequented by the Forest Vole (*M. fontigenus*) and the Mole Shrew (*B. breviceauda*). So far as I am aware these specimens represent the second record for Ontario, the other being Miller's two specimens collected at Peninsula Harbor, in 1896.

SMOKY SHREW, *Sorex fumeus* Miller.

Only one specimen of this comparatively rare shrew was collected at Ridout. Its identity among many of the common shrews was for a time uncertain but it has now been referred to this species by both Mr. W. E. Saunders and Dr. R. M. Anderson. It was collected on Oct. 12, 1918 and measured: Length, 108 mm.; tail vertebrae, 44 mm.; hind foot, 15 mm.

Colour:—Bicolor; back, dark brownish; underparts slightly paler rust brownish. Pelage slightly glossy.

MARSH SHREW, WATER SHREW, *Nesorex albi-barbis* (Cope).

At Ridout I found that the water shrew was uncommon. Three specimens collected may be described as follows: Color—Above very dark, in some lights almost black, in others, faint brownish-black or greyish-black, overlaid almost imperceptibly with silvery tip to some hairs giving it a slight frosted appearance. Belly silvery-grey washed with dusky, heaviest between forelegs. Whitish around lips and chin. Tail bicolored, blackish above and around the tip, white below. Feet, light brown and fringed with silvery, bristle-like hairs, adapted for swimming. All are apparently adult and in winter pelage.

It is perhaps strange that I found the water shrew in only one very limited locality at Ridout. This was along a small brook which flowed down from the timbered hills and entered the Ridout river a short distance east of the station. At intervals its margin was grassy and moss-grown and underneath this by lifting away the growth, the tiny tunnels of the shrew could be seen. In a space about twenty-five yards in length along the western bank of this streamlet I trapped the three specimens mentioned, all in four days, from Oct. 4 to 7, after which no more were taken. Beyond doubt extended diligence would locate other small

families or colonies along other brooks, beside the river or about beaver meadows. The other small mammals taken in the traps set for *N. albibarbis* were *Blarina brevicauda*, *Sorex personatus*, and if I remember rightly the only specimen of *Sorex fumeus* which I collected on the trip.

SHORT-TAILED SHREW, BOB-TAILED OR MOLE SHREW, *Blarina brevicauda* Say.

The eastern shrew is very common at Ridout.

The seven specimens collected average larger than those given by Merriam from type locality* (near Blair, Neb.) and considerably larger than his eastern specimens from Martha's Vineyard, Mass.

The Ridout specimens are also larger than the average of nine specimens taken from my collection at Preston, Ontario.

As is usual within its range, this shrew was found at Ridout in nearly all situations, from low, mossy swamps to wooded ridges. Scarcely a trap in any of these places but sooner or later yielded a *Blarina*. It was uncommonly abundant in low grassy meadows adjacent to dank spruce woods. By pressing the vegetation aside in these places I discovered small feeding pockets beneath, arched over thickly with grass, the bottoms, being covered with varying depths of excrement. Examining these places, the first day at Ridout, I credited the sole ownership to the Forest Vole (*M. fontigenus*) but soon discovered my mistake, for from six traps set in a grassy depression not over fifty feet in diameter, the following morning I took three blarinas and only one *Microtus*. Favoring *Blarina*, the ratio as a whole was even greater than this; in fact it is the most abundant species of mammal in the region and perhaps anywhere in Eastern North America.

Occasionally I found specimens in traps set for *Eutamias* and *Synaptomys* under logs in the deep moss of spruce woods; other times in hill-side sets among the pines intended for *Peromyscus* and just as often in the subterranean tunnels of *albibarbis* along the streams. The grassy sink-holes or meadows dotted with low bushes and shrubs, appear, however, to constitute the over-flowing nucleus from which, radiating, they invade every conceivable surface situation.

BLACK BEAR, *Ursus americanus* Pallas.

The black bear is reported as being tolerably common throughout the region. Although numerous signs both recent and old were observed, no individuals were encountered. The black bear usually eludes the hunter very cleverly, offering comparatively few shots, but large numbers are taken in heavy steel traps every spring. The following brief "experience" was told to us by a trapper on Oct. 30.

In search of good trapping grounds, he came suddenly upon a big black bear feeding, partly concealed behind a low windfall. The trapper carried no fire-arms, only a light axe and a hunting-knife, but was determined not only to discover what the bear was feasting upon but also if chances offered to kill it with the axe. But contrary to the usual custom, bruin preserved a stern front and refused to quit the scene. Several experimental advances on the trapper's part ended with negligible results and the conviction that discretion was here the better part of valor. Several times old bruin waddled a few paces away, but would immediately return with wicked eye, watchful and sullen. After some manoeuvring however the trapper detected the protruding blade of a moose's antler but further critical scrutiny was suspended as impracticable.

The interesting point lies in the fact that a few days previously a bull moose was wounded near the Ridout river five miles to the east, and when last seen was running in a westerly direction. We suppose that the dead moose and the wounded one are identical and before succumbing to injuries had traversed the considerable intervening distance.

GRAY WOLF, *Canis occidentalis* (Richardson).

Wolves are reported as occurring throughout the timbered portions of Algoma and Sudbury, but never numerous. None of recent occurrence at Ridout. Inferring from many wild wolf stories afloat, the tribe seems numerous enough north of Superior and surrounding Lake-of-the-Woods.

COMMON RED FOX, *Vulpes fulva* Desmarest.

The red fox occurs in fair numbers at Ridout judging by reports and the numerous tracks observed in the snow about the wooded hills and over the open ridges. All the freak color phases, black, silver and cross are represented in the pelt collections taken from the country.

MARTEN OR AMERICAN SABLE, *Martes americana* (Turton).

No sign of the marten was seen at Ridout, although I traversed several tracts of very likely looking country. My friend Mr. Visser informed me that three skins were procured by him from Indians coming in from the south, apparently from the region of Wakami, Pike, Trout and Kebskashishi Lakes. It is quite likely that all the old forests in Algoma not visited by fire are inhabited by marten in varying numbers. While on a canoe trip north of the confluence of the Ridout and Walkam rivers in Oct., 1917, I saw what looked like good marten country but had no time to investigate. This was high, heavily-timbered country about a fair sized lake. On the Standard Top. Map (Cartier Sheet) this body of water bears no name.

While exploring some heavily timbered country

* N. A. Fauna. No. 10, p. 11, 1895.

Miller* remarks: "At Nipigon a trapper told me that martens, wherever they occur in sufficient numbers, so terrorize the red squirrels by constant persecution that the noisy rodents, learning that silence is their best protection, stop chattering. Hence an abundance of silent squirrels is—according to my informant at least—a certain indication that marten fur is plenty. According to this, there are no martens at all near Ridout.

FISHER, *Martes pennanti* Erxleben.

Consensus of opinion admits this animal as commonly occurring in all the wooded country. An ex-forest-ranger with whom I talked said that while existing in fair numbers, they never became abundant, according to his observations. On Oct. 18, I took one in a bear trap set at the offal of a moose, near the Ridout river. This was several miles north of the railway and in a comparatively heavy belt of spruce timber. The specimen was a well matured male and according to numerous published measurements exceeded the usual size. Total length, $36\frac{1}{2}$ inches; tail, $14\frac{1}{2}$ inches; foot, 5 inches. The ground color over all was a brown of medium depth very liberally besprinkled dorsally with hoary greyish-golden guard hair; the posterior portion more suggestive of gray.

The fisher is regarded as one of the few successful enemies of the porcupine from the frequency of "porky" javelins somewhere in its anatomy, which as a rule produce no bad effects. Although my specimen was apparently an old adult, no evidence of this was to be seen. Probably the general scarcity of *Erethizon* would account for it.

SHORT-TAILED WEASEL, *Mustela cigognanii* Bonaparte.

Numerous tracks of weasels were noted especially during the autumn of 1917. No specimens were secured, but the trails and a single medium sized weasel hastily observed near the station were referred to this species.

MINK, *Mustela vison* Schreber.

The mink is fairly common at Ridout. The lavish distribution of streamlets, rivers and lakes throughout the region should prove a very congenial home for it. After a light fall of snow in November, 1917, I saw signs of one along the border of a small brook. A trainman saw one running along the Ridout river on October 25, 1918.

CANADA SKUNK, *Mephitis mephitis* Schreber.

Skunks are found in varying numbers throughout the region, but their distribution is governed locally by favorable situations. Much of the country is clothed heavily with conifers, and where this exists

with low, damp, mossy ground the skunk could scarcely be looked for. The poplar covered ridges with warm southern slopes form a congenial habitat for the species and many occur in the region. In a sandy slope covered with low deciduous trees north of Ridout I found two dens which I think belonged to this species; both had every indication of recent occupation. Mr. Visser has observed the animal on but two or three occasions at Ridout but informs me that its occurrence is more frequent about the higher ground at Lake Pishkniogama a short distance west of Ridout. The first week in November, 1917, we saw one cross the rails near the station and disappear in the woods.

CANADA OTTER, *Lutra canadensis* (Schreber).

Mr. Visser informs me that although the region yields a number of skins each year, the species is not very common. Where, as at Ridout, the nature of the rivers are such that no alluvial material is deposited along their courses, evidence is scant in determining the occurrence of terraqueous species such as the other. Personally I observed no signs.

After ice forms, and there is a surface of light snow, the long excursions of the otter marked by its conspicuous trails are commonly seen. They delight at this time in the fair open expanses of river and lake and enter into long nocturnal journeys. Once, on ascending the Hay river in Alberta, a fresh otter trail of the night before preceded me all day and was still in evidence when I camped for the night, headed strong into the mountains. The distance traversed by this animal before and after my own day's journey of about fifteen miles, and added to it would, if known afford a very interesting and perhaps surprising figure.

The usual mode of travel at such times is the alternate jump, and slide, peculiar to the species, with the latter five or six feet in length and maintained in untiring regularity by the momentum received from each quasi-double bound. Each river riffle on these journeys are unfailingly explored, with varying success. If compensated the evidence is plain enough—a few flecks of blood, probably a fin, or a number of scales, and a yellowish stain in the water-soaked snow at the lip of the ice-hole. A corpulent male shot in November while feeding on a wild duck at one of these holes, was rankly "fishy" and loaded with fat.

CANADA LYNX, *Lynx canadensis* Kerr.

According to all accounts the lynx is at present the commonest furbearer in Algoma, and the Indian's specialty. The recent annual "catch" I understand has been large but the diminution of hares may soon cause a change of local fortune in lynx skins. Lynx snares of former date were frequently noted along the Ridout and Wakami rivers,

*Miller, Jr., G. S., Mammals of Ontario, Vol. 28, No. 1, p. 42, 1896.

indicating the animal's habit of travelling in such places. Winter or summer they seem to have a regular route, usually at the forest's fringe; about rivers, lakes, or natural meadows rather than in the extreme depths. In western Alberta I learned that the Indians know these routes so well that snares at peculiarly favorable places are maintained in season, from year to year and are handed down as a heritage from father to son. The general topography of a region usually suggests to the experienced man, the favorable disposition of snares. Lynxes do not confine themselves to the lowlands for they possess an inherent love of expanse that betakes them regularly to breezy heights or the lip of yawning space.

One day, in November, I happened upon a young Indian preparing a snare for lynx on a semi-forested elevation hundreds of feet above the Hay river. Expressing surprise at the choice of such a place for a snare the young Cree answered in broken English "Him good; much go." I took his word for it. Passing by a few days later while moose hunting, sure enough a big cat was there, choked to death and apparently by his own effort, for both front feet were stiffly braced against the toggle to which the snare-thong was tied.

It is perhaps interesting to note that the inevitable "beaver castor" so alluring to many animals, is equally so to the big cat. He simply cannot resist it. To purr and rub his neck against the concoction is apparently the one unsatisfied ambition,—unsatisfied because the snare acts first. An Indian that I entertained in my cabin one night loosened up enough to tell me that the Crees' common brown "lynx dope" was simply a mixture of boiled rabbit liver and beaver castor. As beaver were protected in Alberta at that time, we are permitted to guess where they got the "castor."

DUSKY WHITE-FOOTED MOUSE, *Peromyscus maniculatus maniculatus* (Wagner).

The white-footed mouse is fairly common at Ridout, having collected it in nearly all high situations both semi-barren and timbered.

By measurements (actual and relative) nine specimens taken come well within the limits of *P. m. maniculatus* (Wagner) = *Peromyscus canadensis umbrinus* Miller, recorded from Peninsula Harbo', Ont. (Notes on the Mammals of Ontario).

"These specimens do not seem to show any intermediate characters in measurements or coloration with *P. maniculatus gracilis* (Le Conte) = *P. canadensis canadensis* Miller." R. M. Anderson.

All but one have tails slightly less than half the total length. All have under-sides of hind-feet

haired except on the pads and spaces between—length 20 mm. or greater.

This northern variety of the white-foot, was found in nearly all of the greatly diversified surface situations. Include *Blarina* and the two cover the territory very well. On the very edge of low mossy woods I have taken them in traps set for *Eutamias* (Red-backed Vole) and likewise in "sets" made on high ground intended for other mammals. One afternoon while crossing a small barren plateau I noticed a neat little hole driven deep into the soil beside a log. Miller's incident with *Phenacomys* was immediately recalled, wherefore through a little inductive reasoning I expected next morning to catalogue one of those voles, but alas, the trap held only a lonely *Peromyscus*. That was the closest I got to *Phenacomys*—in all probability rather remote.

The places of commonest occurrence for *Peromyscus*, were about the fringe of woods bordering natural meadows or rocky tree-interspersed land. While trapping for Hoy's shrew (*Microsorex hoyi*) on dry wooded hill-sides, though failing to get that animal, I never wanted for deer mice. North of the station a small glaciated and striated ridge of granite ran east and west, covered with conifers wherever enough till or mould had accumulated in its hollows to support them. On the south side several small wooded terraces sloped down, alternating with rock which often formed low precipitous backgrounds for the former. At the foot of these among the trees I set a number of traps because in the individual character of the situations they seemed to offer good opportunities for intercepting any small mammal that ran the ledge. But, again, though taking a number of the Masked Shrew (*S. personatus*), *Peromyscus* inevitably paid the greater price. And incidentally, this was one place that I failed to get *Blarina*—a genuine relief. Twice I trapped the dusky mouse in low grassy creek borders but the dainty white-foot usually haunted higher ground.

NORTHERN LEMMING MOUSE, *Synaptomys fatuus* (Bangs).

This lemming is uncommon at Ridout. Only two specimens were collected. These are identical in appearance, except for the smaller size of No. 353 which is evidently juvenile or adolescent. They are similar to adult *Microtus p. fontigenus* but the pepper and salt effect on the back is noticeably coarser. These examples were taken in the same strip of swamp. Though persistent trapping in most favorable places was conducted for several weeks, no further specimens were observed. Only a few yards separated the two traps which captured them, both beside decayed, moss-covered logs in the sphagnum of a spruce woods north-east of the station.

The situation is only a couple of feet above the Ridout river's highest water mark. Their preference for cool, mossy, damp woods is clearly evident. No trails made by these animals or any other small mammal could be found; evidently all ranging indiscriminately over the forest floor. The other animals found associated with *Synaptomys* were *Eutamias gapperi*, *Sorex personatus*, and *Microtus p. fontigenus*.

RED BACKED MOUSE, *Eutamias gapperi gapperi* (Vigors).

Though experiencing no particular difficulty in collecting red-backed voles at Ridout, their numbers were evidently much less than were found by Miller north of Lake Superior.

The six specimens taken are all of the red phase. Two individuals are somewhat larger than the others. An examination of the teeth seems to indicate that all are young, with the exception of two which are noticeably inclined to the double-rooted molar of the adult. These were not, however, deep and distinct, better described perhaps as half-rooted.

This was found in two distinct surface situations, the deep mossy woods and the comparatively high ground adjoining them. The first specimen I trapped was on a low pine ridge with an elevation of about forty feet above the contiguous spruce woods. Another was captured in a similar situation but lower in elevation, sparsely wooded, and strewn with rocks. The remainder were taken in deep forests. Nowhere was the species common.

FOREST MEADOW MOUSE; FOREST VOLE; HUDSONIAN MEADOW MOUSE, *Microtus pennsylvanicus fontigenus* (Bangs).

The forest vole appears to be rather uncommon at Ridout; though traps well baited and in favorable places remained set throughout the full time of the trip, only four examples were secured. This seems to suggest a scarcity of the species at least locally. All were taken in natural grassy meadows in the vicinity of the Ridout river. Particulars of the habitat will be found under *Blarina brevicauda*.

I had hopes, after making dental and cranial examinations of these four specimens of finding a *Phenacomys* among them but in this I was disappointed. It is reasonable to suppose that a colony exists in the vicinity of Ridout since Miller took them at Peninsula Harbor and as their range extends east to Labrador.

The blackish-brown, and smaller size of two of the individuals indicate their immaturity. The two other examples, both adults are dull chestnut-brown above, darkened along the back with coarse black hairs. Underparts in one silvery-plumbeous, in the other plumbeous gray tinged with pale buff. All have feet brownish and tails indistinctly bicolored.

MUSKRAT, *Ondatra zibethica* Linn.

Mr. Visser informs me that formerly the muskrat was common in the region but exceptionally high water, I think a couple of years ago, nearly exterminated them. The extensive and elaborate water-system of the country should be very favorable for this animal. Only a couple were seen while canoeing on the Ridout river; while of the usual "sign" on partly submerged logs, little was in evidence. No houses were observed.

CANADA PORCUPINE, *Erethizon dorsatum* Linn.

The porcupine occurs sparingly throughout the region. Although spending several weeks during two autumns in the forests about Ridout only one individual was seen. This one was curled up and asleep under a big spruce in the midst of an extensive coniferous forest. Little trails running out in several directions from the cozy hibernal retreat, showed plainly in the deep moss as they lead up to numerous trees upon which the porcupine fed. The scarcity of the species in the locality may be a reflection of similar conditions throughout the county. Preble¹ found them nowhere abundant on his Hudson Bay trip and remarks: "In a country where the life of the native is a constant struggle for food, the ease with which this animal may be taken, is sufficient reason for its scarcity."

CANADA WOODCHUCK, *Marmota monax canadensis* Erxleben.

I could get no information concerning this animal at Ridout. The season was already too far advanced when I arrived for any collecting, as the animals hibernate in mid-September. Some small burrows observed on sandy southern slopes and credited to *Mephitis mephitis* may have belonged to *monax*.

Miller² reported the woodchuck common at Peninsula Harbor so they may be expected to occur at Ridout. Preble³ also alludes to specimens recorded by Allen from James Bay and Nelson River.

LAKE SUPERIOR CHIPMUNK, *Eutamias quadri-vittatus neglectus* (Allen).

This small form is only of moderate abundance at Ridout. Miller found it "excessively abundant" on the north shore of Lake Superior but these superlatives would not apply in this instance.

Regarding these specimens collected, Dr. R. M. Anderson remarks: "These specimens differ principally from *Eutamias quadri-vittatus borealis* (Allen), Northern Chipmunk, in having the sides much redder; typical *borealis* having the sides pale

(1) Preble, E. A., Mammals of Keewatin; N.A. Fauna, No. 22, p. 59, 1902.

(2) Miller, Jr., G. S., Mam. of Ont., Vol. 28, No. 1, p. 26, 1896.

(3) Preble, E. A., Mam. of Keewatin, N.A. Fauna, No. 22.

yellowish-brown. Occasional specimens of *borealis* from Saskatchewan and Alberta approach these specimens in reddish tint of sides, but have the backs averaging much paler."

In a state of nature, the smaller size of this chipmunk combined with the relatively longer tail carried stiffly erect when travelling, serves readily as a means of differentiation from the larger species *striatus* which shares this same region. At a glance too, it appears much darker, perhaps because of the comparatively closer grouping of the dorsal stripes and the absence of chestnut or deep reddish-brown on the rump which characterizes the big chipmunk.

Neglectus lives not only on the hillsides among the open boulders but also frequents remote places in the tangled wilderness. Twice I found them on slight declivities far in the forest surrounded by a maze of fallen trees, boulders and brush and other things which vex the tired traveller. Thoughts of fatigue, however, disperse when a trim little chipmunk shrills at your elbow, and disappears like a buffy streak with twinkling feet curiously attached to a long tail. In a moment if all is quiet, he may reappear, but most likely scolds and protests from a deep retreat until you leave. One observed in mid-afternoon comfortably hunched in the October sun was discovered later to have been doing some "fall threshing," the grain, so called, having been removed from low shrubs among the boulders.

In favorable places along the railway I found this chipmunk much commoner. Many birds and a few mammals are attracted there by slight grain leakages from passing trains. One "little chipmunk" I could count on seeing nearly every fine day near a pile of boulders bordering the highway; scraps from a near-by boarding car furnishing his meals *de luxe* without further anxiety, and extending his available time for frolic. Sometimes when I wandered by and interrupted this sumptuous pastime he would scramble with great concern over the sloping ballast and leap into a truck beneath the car. Once there I never could discover him, although meanwhile I must have been under constant surveillance as manifested by his prompt return to *terra firma* the moment I was gone.

Neglectus enters traps readily and is successfully retained by almost the smallest sizes. Once I found one dead in a small Victor mouse-trap, (the smallest size) set for a shrew at the base of a mossy stump in a pine woods. This species is said to be harder than the larger chipmunk, remaining above ground much later in the season. In this respect I found only a few days' difference but the forepart of the month (October) which was so favorable to *striatus* terminated in weather unsuited to either, so that the equalizing effect in favor of

striatus terminated in weather unsuited to either, so that the equalizing effect in favor of *striatus* in this instance, diminished the difference between them. Miller, (Mammals of Ontario) found that on the north shore of Lake Superior the big chipmunk hibernated about the end of September. At Ridout, I last saw it on October 12; the two following days were cold and on the 15th it snowed, probably hastening its hibernation. So far as I am aware *neglectus* disappeared for good on October 14.

EASTERN CHIPMUNK, *Tamias striatus lysteri* (Richardson).

The Eastern Chipmunk occurs in about equal numbers with the smaller species *neglectus*. Apparently not nearly so numerous as was found by Miller at Peninsula Harbor and Nipigon. (sub-species *griseus*).

Dr. R. M. Anderson after examining three specimens collected at Ridout reported: "Our museum specimens of eastern chipmunk (*Tamias s. lysteri*) are not strictly comparable with these as to season, being early summer specimens, and averaging lighter in color. The Ridout specimens being in autumn or early winter pelage, show a markedly grayer cast; they also have a much deeper shade of brownish red on the rump than is found in our twenty-five specimens (from Gulf of St. Lawrence, Point Pelee, Lorne Park, Ottawa, and Algonquin Park, Ontario). The Ridout specimens, however, are similar in size to the eastern specimens and are very much smaller than our only specimen from farther west, *Tamias striatus griseus* Mearns, Gray Chipmunk, from Shoal Lake, Manitoba, and unlike the typical *griseus* do not have the dorsal stripes running back on the rump."

While in the Ridout specimens there are no marked separable characters from true *lysteri*, a slight approximation to *griseus* doubtless exists, since Miller's specimens (though typical *lysteri* from North Bay) approached *griseus* more closely than *lysteri* at Peninsula Harbor and Nipigon. Ridout is roughly mid-way between North Bay and the former point.

These large chipmunks inhabit the same general localities as *neglectus* but I believe are more favorably disposed to the deeper woods. Around Ridout, their choice was semi-wooded, boulder-strewn situations near the skirts of the forest and always on high ground. A place of this description, east of the station I visited on October 7. The forenoon was bright and warm and the chipmunk population everywhere in evidence, the calm forest resounding with their hollow *tuck-tuck-tuck* until careful restraint was necessary to prevent an undue impression of their numbers. They were there in conspicuous numbers, however, each "calling" his

best, evidently to emphasize the beauty of the morning.

NORTHERN RED SQUIRREL, *Sciurus hudsonicus hudsonicus* (Erxleben).

The red squirrel occurs in abundance throughout the region.

"The specimens submitted (three) seen to be typical *S. h. hudsonicus*, showing little difference from specimens from Algonquin Park, Kabatogama Lake (St. Louis Co., Minn., near the Inter. Boundary), and Edmonton. The Minnesota specimens approach to the range of *Sciurus hudsonicus minnesota* Allen, but are probably *hudsonicus*. Hollister (Bull. Wis. Nat. Hist. Soc.) places specimens from Two Harbors, north of Duluth, Minn., as *S. h. hudsonicus*." (R. M. Anderson).

The specimens reported upon by Dr. Anderson show a gradual advance from summer to winter pelage—discarding the dark brown of the back, ochraceous-white of the underparts and the black lateral stripe of summer, for the greyish ground color of the back, reddish dorsal band and neutral plumbeous-white of winter. Examination of the specimens seems to indicate a complete moult in about three weeks: Sept. 25-Oct. 14.

It will be interesting to note here in regard to the shedding of *Sciurus* that in one individual the summer coat was being shed uniformly from rear to front, the line of demarkation between the two conditions being plainly evident. In a specimen of *loquax* taken at Preston, Ont., May 13, the same uniformity of shedding prevailed only exactly reversed; the moult beginning at the head and advancing backward. The demarkation in this specimen is very pronounced. The process affecting the new coat seems to be confined chiefly to the active edge of the renewing area, where apparently the old hair drops out and the new replaces it in a gradual advance, each portion maintaining simultaneously the pure color of the respective seasonal pelages, with but little scattered shedding. This unusual manner of assuming a new pelage may be likened (permitting the simile) to an ice sheet, slowly enveloping a continent with the principal physical changes devolving from the active forces of its advancing border.

CANADIAN BEAVER, *Castor canadensis* Kuhl.

I found the beaver common on all the rivers and many of the lakes in the locality. Abundance of signs on the Wakami above its junction with the Ridout river and the absence of lodges indicates the "bank nest" as the permanent abode. Along the latter stream, where dams and lodges are common, the shores for the most part are low, sometimes marshy, and fringed with willows. The Wakami river on the other hand is bordered with compar-

atively high banks and heavily timbered. At present, the trapping of beaver in Algoma is restricted to ten animals each year, per trapper. Each skin must be accompanied by a government "beaver coupon" (each 50 cents) before sale or shipment. This should have a beneficent result toward their conservation.

HUDSON BAY VARYING HARE, *Lepus americanus* Erxleben.

The hare, as is commonly known has its septenary ebb and flow of abundance. At Ridout, conditions pointed to a low ebb; only a few signs, mostly old, were observed, and but one or two animals. A female taken on October 4, 1918, was beginning to change very slightly into the winter pelage over the buttocks and ears. Its two measurements were: Length, 17 inches, (434 mm.); foot, 5¾ inches, (145 mm.)

During October, 1917, the hare was scarce everywhere, although numerous old signs indicated a former abundance. A specimen collected on the 29th had affected a substantial change from the summer coat. Color: Ventral region extending to the throat and including the legs, buttocks, ears, and line anteriorly from eye to ear, nearly pure white. Ring around the neck and on the lower cheek, dirty-brownish white, darkest on the latter. Dorsally, conspicuous brown from shoulders to rump, much suffused with whitish. Fur over nasal and entire frontal, brown, mixed sparingly with white. Upper fringe of the ear, black. Length of hair on the back, 25 mm.

NORTHERN VIRGINIA DEER, *Odocoileus americanus borealis* Miller.

Deer occur, but are not common at Ridout. Whether the moose which are numerous there, exert a positive detrimental influence against the increase of the former is problematical. Probably the general arboreal conditions are not highly favorable to the deer. East of Ridout in all the country surrounding Metagama, Forks, Fluorite and Pogma, I understand the deer are extremely common, supplanting the moose almost entirely. After a fresh snowfall in November, 1917, I saw two deer trails north of Ridout but in October, 1918, none were seen. A trainman reported seeing a fine big buck in the C.P.R. ballast pit a short distance west of the station.

MOOSE, *Alces americanus* Jardine.

Moose are very common in the general vicinity of Ridout and reported in numbers at all points from Cartier to the north shore of Lake Superior. The past fall (1918) was exceptionally favorable for observing these animals. If the weather is mild they frequent the waterways comparatively late in the season. During the past season individuals could

be seen almost any day until the beginning of the last week of October. Previous to that time I saw nine individuals and secured a young bull. As cold weather approaches they retire to the higher woods. On traversing this same general region on about a forty-mile canoe trip commencing Oct. 22, 1917, we failed to see a single animal and attributed it to the very early formation of thin shore ice, which caused the moose to leave for higher situations.

Although individuals of *americanus* from northern Ontario are not recognized as the largest variety, some attain a very respectable size. Some heads taken out of that country I was told, had an antler spread of from fifty to sixty-two inches. Two bulls observed at fairly close range from the canoe could I believe closely approximate those figures.

Mr. Visser and I were afforded a splendid opportunity for hearing a cow "call" during the afternoon of Oct. 8. The canoe had just silently rounded a bend in the river when we noticed indistinctly, a cow, standing among low growth upon the bank; first revealed by the whitish lining of the ears. Meanwhile the canoe with scarcely a ripple drifted nearer and nearer but she made no move, apparently overcome by curiosity. With ears cocked forward and long pendant muzzle slightly projected, she surveyed perhaps the first human being in her life. When within a distance of about thirty yards she lifted her muzzle slightly and called softly; the

effect was peculiarly pleasing—low, tender, pleading, a single syllabled bleat of strange, but soft quality, quaveringly inflected, that seemed vaguely in keeping with the vast hush of the solitude. The next moment a young bull was seen slipping silently away among the spruces, where until this time he had remained discreetly hidden. Even then the cow seemed in no hurry to depart.

WOODLAND CARIBOU, *Rangifer caribou* (Aud. & Bach).

The woodland caribou is only a straggler at Ridout according to all I could learn. Mr. Visser told me of one killed in the vicinity a few years ago but says they are rare. The great number of moose in the country has a tendency, I believe, to drive the caribou from this range. Preble¹ alludes to similar circumstances on information received during his Hudson Bay expedition.

The range of the moose and caribou seems to be gradually shifting of late years. Miller² says of the caribou "very abundant on the north shore of Lake Superior" and regarding the moose "occasionally found, but as a straggler only." In respect to this and information received from different parties in the north, the condition now seems to be exactly reversed.

(1) Preble, E. A., N.A. Fauna, No. 22, p. 40, 1909.

(2) Miller, G. S., Jr., Mam. of Ont., Vol. 28, No. 1, p. 40, 1896.

CANADIAN SPHAERIIDAE.

BY THE HON. MR. JUSTICE LATCHFORD.

(Continued from Volume XXXIV, p. 34.)

12. *SPHAERIUM MODESTUM* Prime has been considered by Prime himself to be a synonym of *S. striatinum*. Monograph Am. Corbiculidae, 1865, p. 37.

The rapids in the Rideau above Billings' Bridge, along the right bank, contain in no small numbers a shell which Dr. Sterki regards as *S. modestum* or distinct. He says: "It is certainly not identical with *S. striatinum* Lamarck. Annals Carng. Mis. Vol. X. p. 436.

If the *sphaerium* which occurs so abundantly at Duck Island is Lamarck's *striatinum*, the Rideau shell is not that species. The latter is shorter, more robust, more inflated, and higher at the umbones. The average of ten full grown shells is 10.4 x 8.33 x 6.38—100: 81.62.

The only member of the family found associated with *S. modestum* in the Rideau is the much longer *Musculium transversum*.

13. *SPHAERIUM TUMIDUM* Baird was described from specimens found by John K. Lord in the Fraser at Sumas Prairie, British Columbia. It is stated to be dark olive in color externally and strongly ribbed. "Within the shell is bluish: long, half an inch; lat. rather more than half an inch."

14. *SPHAERIUM SPOKANI* Baird is another of the shells found by Lord. It is said to be smaller than *tumidum*; more rounded, and with less distinct striae or riblets; color pale horn, shining; white within. Habitat, "Rivers Spokane and Kootanie."

Referring to Osoyoos Lake, Lord says: "The shore is sandy like a sea beach, and strewn thickly with fresh water shells along the ripple line, has quite a tidewater aspect."

(9) The Naturalist in Vancouver Island and British Columbia, by John Keast Lord, Vol. II., p. 75.

I have not seen any true *sphaerium* from British Columbia, though a number of *musculia* and *pisidia*—several of which proved to be undescribed—were collected there for me by the Revd. Mr. Taylor. From Baird's description of *S. spokani* it appears not improbable that the shell is a *musculium*.

It should not be difficult for some member of the Club resident in British Columbia to procure specimens of the shells found by Mr. Lord. His *physa* would be of especial interest. I have examined the types of *Physa lordi* in the British Museum, and they appeared to me to differ not a little from the shell commonly designated by that name found near Ottawa, in Meach and Harrington lakes.

15. *SPHAERIUM PATELLA* Gould is listed by Dr. Sterki as occurring from Northern California to British Columbia. In Vol. XIII of the report of the Harriman Alaska Expedition, p. 138, Dr. Dall mentions that *S. patella* was found in the crop of a duck taken at Pender Island, which is in the southern part of the Strait of Georgia.

16. *SPHAERIUM TENUE* Prime. This little shell resembles *occidentale*. Some systematists have separated the two species from the other members of the family under the sub-generic name *Corneola*. I have not met with it anywhere; but it has been recorded from Ontario and Yukon Territory by Dr. Sterki. Dr. Dall (loc. cit. p. 139) states that it has been found in the Souris river (doubtless in Saskatchewan) and in the Upper Mackenzie, at old Fort Simpson.

What is supposed to be a variety of *S. tenue* has been described by Dr. Sterki as *Walkeri*. The types were obtained in Lake Michigan in water twenty four meters deep. The same shell was found by Mr. McInnes in the Attawapiscat river.

17. *SPHAERIUM VERMONTANUM* Prime has probably a wide distribution in the more southerly parts of the Province of Quebec. Prime states that it occurs in Lake Champlain and Lake Mephranagog. A shell very like *vermontanum* is found in the County of Ottawa, near the Village of Ste. Cecile de Masham. Dr. Sterki says (loc. cit. p. 434) "Specimens which may belong to *S. vermontanum* have been seen from Maine, Quebec and Ontario."

18. *SPHAERIUM SOLIDULUM* Prime must occur in many localities in Ontario. It is widely distributed in the State of New York, and is listed by Dr. Dall (loc. cit. p. 136) from Brandon, Manioba, and Egg Lake, Alberta.

Iowa specimens received in 1883 from Professor Shimeck are pale horn color, shining, and deeply striated. Each adult bears a single dark red band, near the margin in most cases, but varying much in position. Prime gives the dimensions in hun-

dreths of an inch as 56 x 43 x 31. My largest specimen is shorter—12 x 9¾ x 6.7 mm.—but the proportions are identical, 100:77:56.

Other described *sphaeria* which have not, so far as I am aware, been found in Canada, though they doubtless occur here, are in the east, *S. fabale* Prime; and in British Columbia, *S. nobile* Gould, and *S. primeanum* Clessin, both of which are recorded from the State of Washington.

In Dr. Richardson's Fauna Bor. Americana, Vol. III, p. 316, written after his return from Sir John Franklin's Second Expedition, a list of the shells collected includes two *sphaeria* from "Methy Lake, Athabaska" under the names *Cyclas medium* and *Cyclas stagnosticum*. No description is given of either species. All that is stated is that the shells were submitted to James De Carle Sowerby, who was the second in line of a family whose members for nearly a century and a half have been distinguished as artists and conchologists.

The Methy Lake mentioned by Richardson is no doubt the lake on the portage between the Saskatchewan and the Athabasca, east of Fort McMurray, about lat. 56-40 N. and lon. 109-40 W. Dr. B. B. Woodward of the Natural History Department of the British Museum informs me that they do not appear ever to have had Dr. Richardson's shells. *S. tumidum* and *S. spokani* have however been traced by his colleague, Mr. G. C. Robson, who is in charge of the molluscan collection; and figures may be ordered from Miss G. M. Woodward for publication in The Naturalist.

MUSCULIUM.

Musculium is the name now commonly applied to a number of small bivalves formerly classed with *cyclas* or *sphaeria*, but distinguishable by reason of little cups or calyces—the nepionic shells—which project markedly beyond the later grown portions of the valves. The shells, except in one of our species, are thin, pellucid and fragile. All are pale in colour. The striae are fine, and the cardinal teeth small or obsolete. Everywhere in the vicinity of Ottawa they abound in ponds and quiet bays, and occasionally, though rarely, in rapid water. The smaller species are much more alert in their movements than their relatives of the genus *sphaerium*; and the facility with which they single-foot up the sides of an aquarium or the stems of waterplants is little short of marvellous. Every observer of molluscan life should maintain a fresh-water vivarium, even if it consists of no more than the ordinary gold-fish globe. But if small shells are to be studied, gold-fish must be excluded; otherwise the molluscan inhabitants will soon be exterminated.

19. *MUSCULIUM TRANSVERSUM* Say. This is our largest, and, in certain localities, our commonest

species. It appears to be intermediate between the two genera, but bears in most cases the little cupped beaks distinctive of *Musculium*.

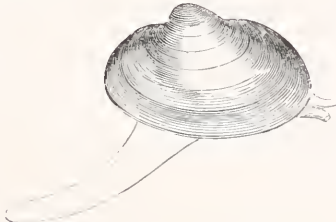


Fig. 3. *Musculium transversum*.

M. transversum abounds in the Rideau Canal, along the right bank, immediately above the by-wash at Hartwell's Locks, and in the by-wash itself. This is the only *Sphaerium* or *Musculium* I have noticed until the discharge is reached, when a few *S. simile* may be found. Lower down the river, it is not uncommon in the rapids near Billing's Bridge. In the Ottawa I have found it along both shores of the lower third of Duck Island. It seems to prefer mud to sand in that locality, and comparatively quiet waters; but it withstands strong currents over clay in the by-wash, and over coarse gravel in the Rideau River.

The number of shells of this species disclosed at Hartwell's Locks when the canal is unwatered is really phenomenal. Nearly all must perish annually, but in many successive summers no lessening of the multitude had been observed.

20. *MUSCULUM TRUNCATUM* Linsley. This shell was first noticed in Nepean Bay, near the Broad Street Railway Station. It has since been found in many other localities. In fact it is a very common shell on the Ontario side of the Ottawa, and in the Ottawa itself, at Duck Island, below the sand bars. The Duck Island shells (No. 2371 of my collection) are thought by Dr. Sterki to be "possibly distinct." In Nepean it occurs in great profusion in a wayside pool four or five miles south of Britannia, and west of the road between the third and fourth concessions fronting on the Rideau. East and West of Britannia village it is to be found in early summer in ponds formed by the overflow of the river, and to the south of the Grand Trunk Railway, in the "hole in the hill" on the the Honeywell farm. Later in ordinary seasons, all these ponds become dry; but year after year no diminution in the numbers of these and other species has been observed. Many shells must survive because either deeply buried, or like *S. occidentale* immune to dessication.

I have not found the shell in the Province of Quebec, though it doubtless occurs there in suitable localities. Dr. Dall (Harr. Expd. Vol. 13, p. 140)

records it as occurring in Methy Lake, Athabasca. One of the Richardson *sphaeria* from the same locality is probably *M. truncatum*.

M. truncatum is very thin, pellucid, and but slightly inflated, the posterior margin is longer in a straight line than that of any other shell of the genus. Exteriorly the shell is straw coloured; interiorly a very pale blue. The average size is 13.2 x 11.15 x 4.5 mm., or 100:87:56.

The anatomy of *M. truncatum* has been most carefully worked out by Mr. Ralph J. Gilmore of Cornell University: *Nautilus*, Vol. 31 p. 16 *et seq.* His figure, which may be regarded as applicable to the entire genus, I am enabled to reproduce through the courtesy of Dr. Walker. The margins, anterior and posterior, of the shells ordinarily found near Ottawa are much less rounded than those of the shell figured.

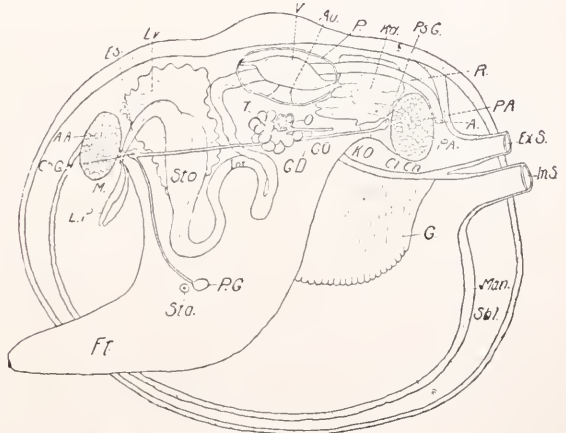


Fig. 4. *Musculium truncatum* Linsley.

- M.—Mouth.
- Lr.—Labial palps.
- Es.—Oesophagus.
- Lv.—Liver.
- St.—Stomach.
- Int.—Intestine.
- R.—Rectum.
- A.—Anus.
- Cb. G.—Cerebral ganglion.
- Ps. G.—Parieto Splanchnic ganglion.
- P.G.—Pedal ganglion.
- Sta.—Statocyst.
- V.—Ventricle.
- All.—Auricle.
- K.O.—Kidney opening.
- T.—Sperm follicles.
- O.—Egg follicles.
- G.D.—Genital opening.
- AA.—Ant. adductor muscle.
- Pd.—Post. adductor muscle.
- Ft.—Foot.
- Cl.Ch.—Cloacal chamber.
- Ex. S.—Excurrent siphon.
- Int. S.—Incumbent siphon.
- G.—Gill.
- Man.—Mantle.
- Shl.—Shell.
- Kd.—Kidney.
- P.—Pericardium.

(To be continued).

NESTING OF THE RUBY-CROWNED KINGLET AT GUELPH, ONTARIO.

BY J. DEWEY SOPER.

A very pleasing situation, both unique and rare in the history of Ontario birds has befallen the lot of the O.A.C. campus at Guelph, Ontario. That this happens to be the favored locality for the nesting of the Ruby-crowned Kinglet, (the absorbing topic in question) will be received by local bird students, I am assured, with a certain satisfaction. So far as a careful search of literature on the subject is concerned, it seems that this is the first authentic record for the species in the southern portion of the province. The Ruby-crown, a bird typical of northern forests, pursues its role of nidification usually far beyond the pale of civilization, where even there to find a nest would be a marked event to any ornithological enthusiast. Consider now, the singular opportunity of studying the home life of these sprightly northerners on the college campus of the O.A.C., at Guelph. Granted, this seems to tax credulity, but we have the indubitable evidence to cheer a bird lover on his way.

Before proceeding further it gives me pleasure, in relation to the discovery of this nest, to announce Prof. Crow of that institution as the recipient for full honors. Some time after the rearguard of the Ringlet migration had passed on north, his attention was attracted to the singing of a Ruby-crown for several days in a clump of spruces opposite the museum. Shortly the singing ceased here but was later detected again in the spruces a few hundred yards to the north. At this time the nest was discovered with both birds in attendance and is believed to be the same as earlier noted near the museum. Evidently they had been loitering about the college grounds all spring.

In attempting to frame an analogical reason for this exceptional occurrence in relation to the spring migration I was about to describe the latter in point of numbers as one above the average. In fact it appealed to me as an unusual one. It is possible, however, that this impression is merely relative, because of my removal from a point twelve miles west, where during the spring and summer of five years I was accustomed to take notes, and where as fruitful a line of migration does not obtain perhaps as up the valley of the Speed, via Guelph. However true this conjecture may be, there assuredly was no dearth of Ringlets during the past spring; and in the strength and duration of the vernal flight the pair under discussion have evidently been lured from their ordinary design by the close approximation to their ancestral home in the vigorous spruces of the campus.

Reference to my migration records shows the species very common from April 25 until May 3, after which their numbers gradually diminished, with two noted on May 9 and the last one on the sixteenth. To this one I instinctively bade silent farewell as the last of the season. A month later came the surprise when word reached me that Prof. Crow had made the discovery. Together on June 25, we visited the scene. Both birds were readily detected in the immediate vicinity. With the aid of the binoculars we watched their actions as they passed to and fro from feeding the young, examined as best we could the high suspended nest by the same means, and were treated frequently to the consummate song of the male.

On the following morning I visited them again for an hour and also during the afternoon of July 1st. Upon this latter occasion with abundance of rope and an extension ladder I scaled to their pretty domicile and gleaned most of the particulars herein concerning their domestic life. Balanced twenty precarious feet in the air opposite the nest and attempting the successful manipulation of a camera was also a part of the engrossing programme.

In view of the paucity of information concerning the life-history of the Ruby-crown, I conceive it as pardonable to digress somewhat from that brevity which is the soul of wit, in favor of that greater detail which it was my privilege to obtain.

The nest, composed entirely of moss and lined with feathers, was discreetly and beautifully hidden among the drooping branches of a large white spruce. Semi-pensile of construction, and swung twenty feet from the ground, it enjoyed all the advantages of unrestricted space. It was placed at that point where the foliage massed itself the heaviest on the bough, in this instance about four feet from the drooping tip and ten from the trunk. The shaggy pendant foliage so effectually concealed it that visibility was certain only from below. Contrary to most structures of this kind no use was made of the main horizontal limb but was welted directly beneath it to numerous thin, dead, flexible twigs which had been denuded of their needles. These passed vertically down the outside walls of the nest at intervals about its full circumference, undergoing a flexion beneath it where the tips touched and were well secured. Thus it will be seen that the nest actually reposed within a wicker basket entirely free of the main branch. The latter was about two inches above the rim of the nest—just enough to admit the ready passage of the birds. The nest was

perfectly globular in form and incurved sharply at the top. This produced an effect seldom met with in bird architecture. Instead of the usual interior perpendicularity or even an outflare to the walls, the rim rapidly converged, causing its equatorial circumference to bulge bowl-fashion with the throat but half the diameter of the latter. It would be improbable or quite impossible for the wildest tempest to dislodge the young from this cunning chamber. In point of real beauty of materials it yields to many warblers that I know, but like its voice is of remarkable strength and volume for a bird so small.

As near as I could ascertain on July 1st, the nest contained five young. These in certain similitude to that of chickadees were so closely packed in the nest that it seemed folly to entirely disturb them; for having done so for the purpose of making certain on this point left me doubtful as the possibility of having the nest contain them all again. They were a general olive color similar to that of the parents and about two-thirds grown. Both tail and wing quills were well advanced.

Having secured myself in the tree, on June 26, at a point level with the nest, it became a matter of ease to watch the actions of the birds. The nest became less visible from this position, though only a few impassible feet distant, but in comparison to observation from the ground was much superior. During the half hour which I clung to the tree the male visited the nest with food three times and the female twice. The former upon deposition of the food vacated the nest promptly but the female on the contrary, often remained with the young until the return of her mate, when she then slipped quietly away. In this manner the young were left alone for certain periods but sheltered again for longer ones when the female returned.

During observation from the top of the ladder on July 1st, when it was balanced only three feet distant from the nest, many points of interest became known. The detention of the female at the nest I observed, was due to her habit of regularly cleansing the nest of all the sac-like excrement; due to the rapid digestion of the hungry infants, her obligations in this respect seemed never to cease. The matter was probed for with scrupulous care, some consumed by her, and the remainder dropped overboard at some distance from the nest. In this the male never assisted. Candor bids me remark however, that his tireless assiduity in harvesting for the young more than offset this disparity.

In respect to their disposition I discovered the greatest satisfaction. Imagine these two creations, inexpressable in modest beauty, incomparable in

graceful deportment, ineffable in euphony of song, passing to and fro in the execution of their poetic labor destitute entirely of fear or suspicion. With my face only a couple of feet distant from the nest the pair continued their work scarcely conscious of my presence. True, at first they hovered above me with sweet queries in their throats and entered the nest from the opposite side of the bough but soon this discretion was forsaken for perfect freedom. Twice, the male warbling an undertone alighted within two feet of my hand on the supporting guy rope of the ladder. A pretty performance and employed only by the male was to flit from the nest and become suspended on whirring wings before me, like a hummingbird before a flower. It seemed like a feathered phantom surrounded by a halo of changing light, supported by some strange and magic force of gravitation. Having satisfactorily examined me in this aerial fashion he would flit easily away perhaps singing as he went. Thus, without sign of timidity each came near with advances of delightful piquancy, the male engaged in melody and the other quaintly moving about in silence. The first time she uttered any note in my presence was when tapping the limb gently during one of her protracted visits to the young, she flitted with great celerity from the nest calling petulently in a single sweet querulous note identical in pitch and quality to the prelude of the male. She later, on one or two occasions, voiced the same call. Theirs was no suspicious and labored advances; no unconsolable, strident and satirical calls, but conversely, uttering no protest, slipped demurely from limb to limb with sweet-tempered curiosity suggesting certain concessions of welcome.

Only two distinct species of insects were observed to attract the attention of the Kinglets at this time. One, a delicate, winged gnat composed only occasional offerings to the young. The other, a dull whitish insect apparently without wings, was freely and regularly given. The offerings of the female were identical. The male persisted in song near and far during the gleaning of food and ranged for this purpose from ten to fifty yards at least from the nest.

The song of this species has attracted no little comment during its spring migrations, when it is available to so many whom fortune otherwise would never favor. It is of unqualified distinction. For strength and beauty of tone in comparison to its size I regard it as peerless. No poor words of mine can express the supernal sweetness of this production. It wavers and trills in such exquisite tone color, such transparent delicacy, such distilled freshness—what superlatives can do it justice?

DEADLY POISONOUS MUSHROOMS.

BY R. E. STONE, M.Sc., Ph.D.

Department of Botany, Ontario Agricultural College.

Nearly every year, especially in the late summer and early autumn our woods and fields bear a crop of mushrooms. Many people would enjoy collecting and eating them, but since some of these fungi are deadly poisonous, many are deterred from gathering them because they are unable to tell with absolute certainty the edible from the poisonous forms.

In Ontario there are at least two hundred (200) kinds of fleshy fungi of which sixty (60) occur in abundance, and are large enough to collect for eating. Unfortunately a few of these are deadly poisonous and sometimes occur in quantity. Some of these are also very attractive and always clean.

is edible. Unfortunately some of the deadly poisonous kinds will peel beautifully. Others say, collect only those that are pink underneath; this although good advice, unfortunately limits one's choice to but a few of the edible kinds. Still others say, never collect mushrooms in the woods but only in the fields, yards and gardens. This is again, excellent advice but also limits our choice and eliminates many of the very best. There is no simple rule that can be applied; one must learn to know the poisonous forms the same as he knows other plants. In order to enable mushroom lovers to avoid the dangerous forms, the most dangerous forms are described and figured below.



Fig. 1.—Fly Agaric (*Amanita muscaria*, Linn). Deadly Poisonous.
From Bulletin 263, Ontario Department of Agriculture, Ontario Agricultural College.

The question is often asked—"How do you tell a mushroom from a toad stool" meaning by toad stool a form that is either inedible or poisonous. There is no simple rule. Occasionally one sees published the old silver test. This is an old idea and still prevalent in some places, especially Italy. In olden days silver was accredited with many magic properties, especially that of turning black in the presence of malign influences, hence, silver would turn black in the presence of poison. This test can not, of course, be relied upon. Another test often spoken of is the peeling test. Some of our mushroom gatherers say that if the outer skin of a mushroom can be peeled off readily, that the mushroom

is edible. Unfortunately some of the deadly poisonous kinds will peel beautifully. Others say, collect only those that are pink underneath; this although good advice, unfortunately limits one's choice to but a few of the edible kinds. Still others say, never collect mushrooms in the woods but only in the fields, yards and gardens. This is again, excellent advice but also limits our choice and eliminates many of the very best. There is no simple rule that can be applied; one must learn to know the poisonous forms the same as he knows other plants. In order to enable mushroom lovers to avoid the dangerous forms, the most dangerous forms are described and figured below.

FLY AGARIC (*Amanita muscaria*, Linn). Deadly poisonous.

This fungus appears in July and August in groves and open woods or along roadsides near trees, usually preferring rather poor soil. (Fig. 1.) It is called "Fly Agaric" because an infusion of the plant was at one time used as a fly poison. The plant is typically large and handsome.

The cap is 3 to 5 inches broad, rounded when young, nearly flat when old, yellow or orange or even bright red in color, and covered with numerous angular scales, which are white or light yellow in color and can be easily brushed off. As the cap becomes old it fades out, so that it may become

nearly white and the scales may be washed off by rains.

The stalk is 4 to 6 inches long, about half an inch thick, usually white but often yellowish in color, hollow in age. The bottom of the stalk is enlarged into a prominent bulb which is more or less rough and shaggy or scaly. The lower part of the stalk above the bulb is also shaggy.

The gills are white or slightly tinged with yellow and do not become pink or brown as do those of many edible mushrooms.

weakening of the heart action. Of course, when symptoms such as these appear after eating mushrooms a physician should be sent for immediately.

The system should be freed of the undigested fungus as soon as possible. Strong emetics such as zinc sulphate, apomorphine or warm mustard and water should be used. If these are lacking or produce no effect tickle the throat with a feather or the finger to cause immediate and violent vomiting. This should be followed by a strong dose of castor oil.



Fig. 2.—Deadly Agaric (*Amanita phalloides*, Fr.) Deadly Poisonous.
From Bulletin 263, Ontario Department of Agriculture, Ontario Agricultural College.

The ring is quite large, white, and firmly attached to the stalk.

The main points to remember about this fungus are:—The yellow or orange cap with loose white scales. Gills white, never becoming pink or brown. Ring large, white, firmly attached to the stalk. The stalk enlarged at the base into a prominent shaggy or scaly bulb and the stalk shaggy between the bulb and the ring.

The poison in this mushroom is known as muscarin. This substance fortunately has an unpleasant bitter taste, so that the plant is seldom eaten even if collected by mistake. The poison does not act immediately, but the symptoms appear in from $\frac{1}{2}$ to 2 hours, and are: vomiting and diarrhoea, with a pronounced flow of saliva, suppression of urine, giddiness, uncertainty of movement, derangement of vision. This is followed by stupor, cold sweats and

THE DEADLY AGARIC (*Amanita phalloides*, Fr.) Deadly poisonous.

This fungus is called the Deadly Agaric because it is extremely poisonous and there is no known antidote for the poison. (Fig. 2).

The plant usually grows in the woods or along the borders of woods, but has also been known to appear in lawns. It generally appears in July and August. It is quite variable in color, varying from pure white through yellowish to olive.

The cap is 1.5 to 5 inches broad, at first bell-shaped, finally nearly flat, fleshy, viscid or slimy when fresh, smooth, often with a few loose white scales. The color varies from white, through yellow to olive green, the dark forms being more common in Ontario.

The stalk is 2 to 8 inches long, $\frac{1}{4}$ to $\frac{1}{2}$ inch thick, hollow, white or colored like the cap, but

lighter in shade, becoming discolored on handling. It ends in an abrupt bulb which generally has a sharp rim standing up around it, forming a sort of cup, called poison cup or volva. This poison cup is usually deeply buried in the soil, so that in order to find it it is necessary to dig the plant up.

Gills white and remain white, never becoming pink or brown.

The ring is white, prominent and is high up on the stalk close to the cap. The ring is attached to the stalk, not loose as in the smooth white mushroom or parasol mushroom.

The poison in the Deadly Agaric is phallin. This poison, unfortunately, has no pronounced taste or odor and gives no warning of its presence. Unfortunately, also, the symptoms of poisoning do not manifest themselves until 9 to 14 hours after the fungus is eaten. There is then considerable abdominal pain, and there may be cramps in the legs accompanied by convulsions and even lock-jaw and other tetanic spasms. The pulse is weak and abdominal pain is rapidly followed by vomiting and extreme diarrhoea, the intestinal discharges assuming the rice-water condition characteristic of cholera. These later symptoms persist, generally without loss of consciousness until death ensues, which happens in from two to four days.

There is no known antidote for phallin. The undigested portions of the fungus should be removed from the stomach and intestines by methods similar to those suggested under Fly Agaric. If the poison already absorbed is not too great, it may wear itself out and the patient recover. Of course, when symptoms of poisoning appear a physician should be sent for immediately.

THE DESTROYING ANGEL (*Amanita verna*, Bull.). Deadly poisonous.

This fungus is probably the cause of more cases of mushroom poisoning than any other. (Fig. 3).

The plant is pretty, clean, pure white and attractive.

It usually occurs in the woods or near them, but may grow in lawns newly made from forest soil. It is generally found in June and July.

The cap is 1.5 to 4 inches in diameter, at first bell-shaped, later becoming nearly flat; pure white, shining, viscid or slimy when fresh.

The stalk is 2 to 6 inches long, $\frac{1}{4}$ to $\frac{1}{2}$ an inch thick, pure white, hollow in age. The stalk ends in an abrupt bulb, with a free border closely surrounding the base of the stalk and forming the poison cup or volva. This may be seen in even young specimens. This poison cup is buried in the soil, so that in order to see it it is usually necessary to dig up the plant. For this reason wild mushrooms growing in the soil should always be dug, not pulled up or broken off.

The gills are pure white and remain white, never becoming pink or brown.

The ring is broad and high up on the stalk, just under the cap. It is firmly attached to the stalk and is not loose, as in the smooth white mushroom.

Since this is our most poisonous mushroom its main characters should be thoroughly learned and remembered.

The cap is pure white, shining and slimy when fresh. The stalk is pure white, ending in a distinct poison cup or volva. Gills pure white and remain white. Ring white, broad, high upon the stalk to which it is firmly attached.



Fig. 3.—Destroying Angel (*Amanita verna* Bull.) Deadly Poisonous.

From Bulletin 263, Ontario Department of Agriculture, Ontario Agricultural College.

The poison in this fungus is the same as that in the Deadly Agaric and the symptoms of poisoning and treatment are the same.

SCARLET CAP (*Russula emetica*, Fr.) Reputed to be mildly poisonous.

This fungus occurs very commonly in the woods from summer till autumn. It gets its name from the bright scarlet cap. (Fig. 4). It is hot and peppery to the taste and some report it to be mildly poisonous, while others say that it is edible.

The cap is 1.5 to 3 inches wide, thin, brittle, deep pink to rich red; furrowed near the edge,

rounded when young, depressed in the centre when old.

The stalk is 2 to 3 inches long, white or tinged with yellow. Very brittle. There is no ring and no volva or poison cup.

Besides the scarlet cap, some of the forms with milky juice are mildly poisonous. They are very hot and the milk is not reddish, as with the Orange Flow (*Lactarius deliciosus*).

There are some mushrooms which have tubes in place of gills. Some of these are edible and others poisonous. The poisonous ones have a flesh that changes color when cut or broken or have tubes with red mouths. There are a few mushrooms that have clay-colored gills and a cobwebby veil that should also be avoided.



Fig. 4.—Scarlet Cap (*Russula emetica* Fr.) Mildly Poisonous.
From Bulletin 263, Ontario Department of Agriculture, Ontario Agricultural College.

Many mushrooms are wholesome when fresh but become dangerous when they begin to decay, or show evidence of the work of insects or worms.

JACK-O-LANTERN, False chantarelle. (*Clitocybe illudens* Schw.) Mildly poisonous.

This is a large mushroom growing in clusters on decaying wood. At first the plants are a clear yellow but later become brownish. When seen in typical clusters it is very attractive but is mildly poisonous. Fresh specimens when placed in the dark give off a pale yellowish light, i.e. they are phosphorescent.

The cap is from 4 to 6 inches broad and more or less funnel-shaped, yellow; stem 6 to 8 inches long, solid, yellow, tapering towards the base. Gills yellow and running down on the stem. There is no ring and no poison cup or volva.

Some people can eat this mushroom but to most it is distinctly poisonous, producing nausea, vomiting and diarrhoea.

When these symptoms occur, following the eating of mushrooms, the digestive system should be cleared by purgatives and a physician sent for.

GATHERING WILD MUSHROOMS.

When one is gathering wild mushrooms a basket is the best receptacle for carrying them, as different compartments may be made for holding the various kinds, and thus keep from crushing and spoiling the more tender ones.

When collecting mushrooms for the table they should never be pulled up or broken off. In the deadly poisonous mushrooms the most marked characteristic, the poison cup or volva, is deeply buried in the soil. If the plant is pulled up or broken off the poison cup is lost and it is impossible to distinguish the poisonous kinds from certain edible ones. After a mushroom has been carefully dug up and examined and the collector is certain that it is edible, the lower part of the stalk may be cut

off to get rid of the dirt. It is often very difficult to determine mushrooms from the young or button stage, so that unless buttons are accompanied by mature plants, they should generally be avoided. In case of doubt the fungus should be discarded or the complete specimen shown to one who knows mushrooms very thoroughly.

RULES TO BE OBSERVED IN GATHERING WILD MUSHROOMS.

It is impossible to give a simple rule or test for detecting poisonous mushrooms. Care must be taken to observe the characteristics of each mushroom gathered.

The following rules, if carefully followed, will enable one to avoid the poisonous forms:—

- (1) Avoid fungi when in the button or unexpanded stage; also those in which the flesh has begun to decay, even if only slightly.
- (2) Avoid all fungi which have stalks with a swollen base surrounded by a sac-like or scaly envelope, especially if the gills are white.

- (3) Avoid fungi having a milky juice, unless the milk is reddish.
- (4) Avoid fungi in which the cap is thin and very brittle, and in which the gills are nearly all of equal length, especially if the cap is bright-colored.
- (5) Avoid all tube-bearing fungi in which the flesh changes color when cut or broken, or where the mouths of the tubes are reddish and in the case of other tube-bearing fungi experiment with caution.
- (6) Avoid fungi having clay-colored gills and a spider web or woolly ring on the stalk.
- (7) In case of doubt discard the plant.

MUSHROOMS WHICH MAY BE GATHERED.

The foregoing rules are given as a warning against comparatively few plants; the edible mushrooms are more numerous and those that may be gathered are as follows:—

All the puff balls and coral fungi; any of the hedge hog or spiny fungi and the morels; also any mushroom whose gills become brown; mushrooms having reddish or orange milk; all mushrooms that melt down into an inky liquid when mature; many mushrooms with white gills, but care must be taken to be absolutely certain that they have no poison cup or volva.

LEARN TO KNOW THE MUSHROOMS.

Before attempting to eat a large number of mushrooms one should learn to know them by their individual characters, the same as he would learn to know berries or other wild fruit. The best way to do this is to secure a book describing the various

kinds and then gather the different ones and compare them with the descriptions and illustrations. Another way is to go out into the woods and fields with someone who knows the mushrooms and have the different kinds, both poisonous and edible, pointed out and the characters explained.

Still another way to learn the mushrooms is as follows. Carefully dig up the mushrooms so that all the fruit body including the very base of the stem is present. Wrap in dry paper, taking care not to crush the specimen, attach a note describing where the plant grew, i.e. fields, woods or road side; whether it grows in the ground, or wood and the color of the fresh specimen. The specimen should then be enclosed in a strong cardboard carton or wooden box and sent in to the Department of Botany, Ontario Agricultural College, Guelph, Ont.

If the specimen is carefully packed, it will arrive in fair condition and the name and properties of the mushroom will be sent to you by the next mail.

BOOKS THAT DESCRIBE MUSHROOMS.

McIlvaine, Chas.—One Thousand American Fungi.

Hard, M. E.—Mushrooms, Edible and Otherwise.

Atkinson, Geo. G.—Mushrooms, Edible, Poisonous, etc.

Marshall, Nina L.—The Mushroom Book.

Gibson, Hamilton—Our Edible Fungi.

Murrill, W. A.—Edible and Poisonous Mushrooms.

Stone, R. E.—Mushrooms of Ontario; Ontario Department of Agriculture, Bulletin No. 263.

NOTES ON THE SUMMER BIRDS OF THE GASPE PENINSULA, PROVINCE OF QUEBEC.

BY CHARLES W. TOWNSEND, M.D., BOSTON.

In planning a trip to any spot in North America, one naturally turns to the indices of the Auk and the Bulletin of the Nuttall Ornithological Club in order to learn what ornithological work has been done in that region and what birds one may expect to find. As far as I can discover there has been no list published and no mention made of the birds of the Gaspé Peninsula in these journals. The only notes of this region published by ornithologists elsewhere that I can find are by Mr. Wm. Brewster,¹ Mr. Frank M. Chapman² and Mr. P. A. Taverner³. In none of these notes is there any attempt to list the birds of the region, and it therefore seems worth while to present the following preliminary list. The gen-

erosity of Mr. Taverner in putting his notes, made chiefly at Percé in the summers of 1914 and 1915, at my disposal has made this list of much greater value than if my own notes alone were to be drawn upon.

I feel sure that Mr. Taverner's work in these regions has had the greatest influence in determining

(1) Notes on the birds observed during a summer cruise in the Gulf of St. Lawrence. Proceedings, Boston Society of Natural History, Vol. 22, pp. 364, 412; 1883.

(2) Bird studies with a camera, New York, 1900, pp. 128-145. Gannets of Bonaventure, Bird Lore, Vol. 1, 1899, p. 71.

(3) The Gannets of Bonaventure Island, The Ottawa Naturalist, Vol. 32, 1918, pp. 21-26.

the Provincial Government to make Percé Rock, Bonaventure Island and Bird Rock near the Magdalens, bird reservations. This splendid piece of work was accomplished in 1918 and the wonderful colonies in these three localities are now protected for all time. These reservations are of great value and interest not only to ornithologists but to the general public and they will become more and more known and visited. Both Percé Rock and Bonaventure Cliffs have a beauty and grandeur of size and form and coloring that is unequalled along our Atlantic Coast, but their wonderful charm is increased manyfold by the variety and abundance of the bird life that adorns them. The Provincial Government, which has made them reservations, together with Bird Rock off the Magdalens, is to be greatly congratulated, and it is to be hoped that this is but the beginning of their work and that other reservations may be added elsewhere, especially along the Labrador Coast where they are so much needed. The splendid work of the Audubon Society in the United States may well be taken as a model.

The Gaspé Peninsula projects like a lower lip at the mouth of the St. Lawrence River into the Gulf of St. Lawrence. It lies north of New Brunswick from which it is separated by the Bay of Chaleur and the Restigouche River. A single track railway runs along the southern shore nearly to the end of the peninsula at Gaspé, and for a few miles along the northern shore as far as Matan. A carriage road follows the shore of the whole peninsula and there are a few short side roads extending but a mile or two into the interior which is an uninhabited region of forest and mountains. Villages inhabited for the most part by fishermen of French and Channel Island descent, are scattered along the coast.

The geology of the Gaspé Peninsula is most interesting and complicated. At Percé, for example, are outcrops of Cambrian, Silurian and Devonian limestones with strata almost vertical, overlaid in places with a great mantle of horizontal red sandstones and conglomerates. The mountains near the north coast are of gray Silurian limestones and serpentines. At the places visited there was no evidence of general glaciation, but only of slight and local glaciation. There are few lakes and the streams are deeply cut.

The vegetation is of the Hudsonian type,—the forest is largely of spruce,—black and white, and balsam fir. *Arbor vitae*, canoe birches and aspens are common. A few white pines, larches, yellow birches, mountain ashes and sugar maples are to be seen. The avifauna is largely Canadian with a number of Hudsonian and also of Transition forms.

The itinerary of my trip was as follows:—

Crossing on July 5th, 1919 from Campbellton,

New Brunswick, where the Restigouche River meets the Bay of Chaleur, I spent two days at Cross Point in the Township of Mann, and had an opportunity to observe the birds in the woods and fields there. July 7th was occupied in travelling the 150 miles to Cape Cove, from which I was taken by automobile nine miles to Percé. The railroad journey was such a leisurely one, with so many breakdowns of the engine that I was able to see something of the birds and flowers of the region. At Percé, a quaint little French fishing village with beautiful setting of rock, cliff and mountain, I stayed until August 6th and explored the neighborhood including Bonaventure Island, Corner of the Beach and Barachois. On the latter date I went by motor boat some twenty-eight miles to Grande Grève near the easternmost tip of the Forillon, the narrow peninsula that stretches between Gaspé Bay and the Gulf of St. Lawrence. Here I stayed until August 25th and explored the neighborhood including a walking trip through Cape Rosier and Griffin Cove to Fox River, and back through the "portage" to Peninsula, and along the southern coast of the Forillon to Grand Grève. A day was spent in the neighborhood of Douglastown on the southern side of Gaspé Bay and another at Gaspé and on the lower waters of the York River.

Before presenting the annotated list I would say a few words about the two new bird reservations at Percé.

Percé Rock is an isolated mass of nearly vertical strata of Devonian limestone some 1500 feet long, and 288 feet high at its highest point and 300 feet wide at its greatest breadth. It is connected with the shore only at low tides by a bar two or three hundred yards long. At the outer end stands a smaller isolated mass or pinnacle. The main rock is pierced by an arch with a span of about eighty feet and from this the rock receives its name. Percé Rock is an object of exceeding beauty not only on account of its striking shape and great size, but also on account of the brilliancy and variety of its colouring. Its beauty and interest are greatly enhanced by its bird inhabitants which through its inaccessible summit and form a circling cloud. Breeding Kittiwakes to the number of about 400, occupy the shelves and niches of the northern face over the arch. Double-crested Cormorants, a thousand or more and Herring Gulls to the number of 2,000 breed on the flat surface of the summit. A few Black Guillemots nest in some of the holes and corners on the sides of the rock.

I was enabled to make a fairly intimate study of the home life of these birds of the summit through the kindness of Mrs. Frederick James, whose late husband was the beloved artist of the little village of Percé. At her invitation I spent many interest-

ing hours looking through her powerful telescope from the piazza of her house on Cape Cannon.

Bonaventure Island, is three miles distant from Percé and is of still greater value and importance. It is about three miles long and a mile and a half broad. The outer side faces the sea in sheer cliffs of horizontal strata of red conglomerate and sandstone four and five hundred feet high. On the cliffs and niches and along the shelves, tier above tier nest a very large and notable collection of water birds. The most important of these in size and numbers are the Gannets which are most numerous towards the southern end. Mr. Taverner has estimated their numbers to be 8,000. Herring Gulls breed on the cliffs to the number of several hundreds if not thousands. A smaller number of Kittiwakes nest near the northern end of this outer side of the island on vertical cliffs that possess but few and small niches. Murres and Razor-billed Auks, perhaps 500 pairs of the former and 100 of the latter also lay their eggs on the cliffs. A small number of Puffins and a few Black Guillemots are also breeders there, while in the holes and crevices on top of the cliffs Leache's Petrels nest. No Cormorants breed here but visitors from Percé Rock may often be seen.

I visited Bonaventure Island three times, passing in a motor boat close under the cliffs and camping and spending two days on each of the first two occasions; the last time I spent only the day. It is possible to take up a position on the edge of the cliffs where one can sweep with a glass, tier on tier of nesting Gannets and be within thirty feet of the nearest. As they fly by they are almost within arm's reach. With an eight power prismatic binocular and a thirty power telescope I spent many hours watching these birds. With the expert aid of Willie Duval, descendant of of Captain Peter John Duval the original owner of the island, I was able to climb a hundred feet or more up the cliffs from below and crawl along a ledge close to Puffins and Murres. Mr. Taverner¹ has vividly described such an adventure.

ANNOTATED LIST.

1. *Gavia immer*. Loon.
One flying by Bonaventure Island. Mr. Taverner reported a few.
2. *Fratercula arctica arctica*. Puffin.
Thirty or forty pairs of these birds breed in the deep clefts or holes in the cliffs of Bonaventure Island, mostly at the northern end of the eastern cliffs.
3. *Cephus grylle*. Black Guillemot.
Common and very tame all along the rock shores, breeding in holes and in the clefts be-

tween the strata of the rocks. Young were first seen in the water August 1st.

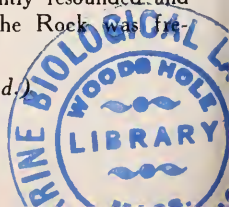
4. *Uria troille troille*. Murre.
About five hundred pairs breed at Bonaventure Island. I met with them at other places on the coast, but do not know whether they breed away from the island or not. Several times I saw Gannets that had alighted in the same niche in the cliffs drive the Murres out. Mr. Taverner reports seeing a number of *ringvia*.
5. *Alca torda*. Razor-billed Auk.
Perhaps a hundred pairs breed at Bonaventure Island. They were to be seen singly, sometimes among the Gannets and in companies of two or three often with Murres in clefts or ledges smaller than those frequented by the Gannets. Flocks of ten or fifteen Murres on the water generally included one or two Razor-billed Auks.
6. *Rissa tridactyla tridactyla*. Kittiwake.
About 400 breed on the northern face of Percé Rock near the arch and about as many on the cliffs of Bonaventure Island.
7. *Larus marinus*. Great Black-backed Gull.
A few seen in July. More common in August. No evidence of breeding.
8. *Larus argentatus*. Herring Gull.
Abundant. Breeds on the top of Percé Rock to the number of about 2,000, on the cliffs of Bonaventure Island and the Murailles at Percé, on the sea cliffs below Mt. St. Albans and on the Bon Ami cliffs near Grand Grève and doubtless on many other cliffs of the Peninsula.

Cod fishing is the chief industry of the coast and the fish are cleaned and split at tables on the beaches or on fishing stages. The heads and entrails are left where they fall and are eagerly sought by Herring Gulls, who gather when the fish are brought in, and do important work as scavengers. They are very tame and may often be seen searching for scraps on empty boats riding at anchor. I have counted as many as 30 on one boat. Until the young are on the wing none but full plumaged adults are to be seen; no birds with black tips to their tails were found in these flocks. The young appeared in the air the last week in July.

A cloud of Herring Gulls, was constantly flying about Percé Rock and their cries were always to be heard by day and frequently by night. The bugle-like courtship song frequently resounded and fighting among the adults on the Rock was frequent.

(To be continued.)

(4) Ottawa Naturalist, XXXII, 21-26.





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BIRDS AND HOW TO ATTRACT THEM ABOUT OUR HOMES.

By J. C. MIDDLETON, LONDON, ONT.

Most of us take a good deal of pride in the surroundings of our dwelling places, and have succeeded in making them real beauty spots. However in most cases with city dwellings we have not the opportunity of carrying out a good many of our cherished wishes, still our surroundings are largely what we make them, individually or collectively. What could be more charming than being surrounded by an abundance of bird life the year round?

Now without trees or shrubs we would have very few birds as they provide protection and shelter from extreme heat and cold, and from the searching eyes of natural enemies such as the cat, dog and birds of prey. They also provide resting and sleeping places as well as meeting places for many of our most favorite birds. Important as all these reasons are, trees, shrubs and plants are indispensable to most bird life for another great reason, that is they provide food either by producing or sustaining it. It is quite true we may have plenty of house sparrows and perhaps birds that feed while on the wing, such as the swallow or martin, without trees, but these are only exceptions which go to prove the general rule. It goes without saying that dense foliage is essential for good protection. This can be best obtained by the use of evergreens, which if planted in clumps or hedges will give ample protection both for summer and winter, their growth is much thicker and heavier than our deciduous trees. A good hedge of spruce trees is a great attraction for birds in the cool nights of early spring, or in the fall, and a thick cover of some sort of evergreen is essential if we are to have the birds stay with us during the winter.

Most close growing shrubs and trees are valuable for nesting places. Of course many birds nest on the ground in clumps of grass or thickets, but these are not likely to build in our gardens unless we have some quiet and unmolested spot.

The different fruits and seeds being produced and ripened at the different times of the summer are either eaten, perhaps when only partly matured, (such as the cherry) or on the other hand hang on long after the leaves have fallen to serve as food in fall and winter.

The myriads of leaf insects, to say nothing of the moths and fruit pests, form a large portion of the birds' bill of fare. Then again what about the borers, and other insects which live either in or under the bark?

The sap of trees is also enjoyed by some birds. For instance, the sapsucker will almost always be found at work where the Balm of Gilead poplar trees are plentiful.

What is our deduction from these facts? Is it not a fact the more nearly we can create these conditions in our gardens, the more birdlife we are likely to have, for after all the two great essentials to success in attracting birds are an abundance of food and ample protection.

Now I don't suppose it would be either practical or wise to have all our garden space taken up with plantings suitable only for bird life; most of us are far too fond of flowers to allow this, but on the other hand how often are gardens planned entirely without a thought for the welfare of our birds. With our system of laying out our cities in blocks what would be easier than to have our back garden separated by hedges. I am quite sure you will agree with me that the garden would look very much more artistic and natural than they are with our present system of board fences. There are many different kinds of trees, plants and vines which are quite adaptable for hedges. If this system could be established, just think what it would mean for the birds, and not only for the birds for I am inclined to think that living between board fences has a very detrimental effect on all our natures, and that if we could but trace where that hard or unsympathetic spot in our natures originated we would find, perhaps back a generation or two, that the rude obstruction of a high board fence around our gardens has had a great deal to do with it.

It would be difficult to name all the best trees and shrubs. Mr. Baynes in "Wild Bird Guests" gives a very complete and quite an extensive list of these with their relative fruiting seasons. I quite agree with Mr. W. E. Saunders that our own native trees are likely to prove more attractive than imported ones. We naturally take to our favorite



1. Upside down feeding box; 2. Upside down feeding slab; 3. Bird Curate placed on window sill;
4. Seed hopper; 5. Mrs. Berry's wired dish; 6. Feeding log.

dishes, so with the birds, they are far more likely to be attracted by a clump of our red native cedars than by trees which they have never seen before. Of course this does not mean to say that we should not plant trees such as the Mulberry, whose fruit is specially attractive, but as a rule our native berry bushes, vines and trees are the best to plant.

Perhaps the most interesting of our bird guests during the nesting season are those which occupy our bird houses. These are so well known that I need not enumerate them. It might be well to dwell for a little on the most suitable styles and locations of some of the preference for what he, or perhaps I had better say she, considers a properly made house. How do we know whether a bird likes a certain style of house or not? This is only found out by observation and experiment. Perhaps Baron Von Berlepsch has achieved more along this line than any other student, having devoted a tremendous amount of time and practically the whole of his large estate to these studies, and bird houses constructed after his ideas have proved most successful. I mention this only to show that through experimenting it is quite possible to find out what kind of houses are preferred by the different birds.

A standard Flicker house would be made from a log say, twenty-four inches long and about eight or nine inches in diameter. The entrance hole, two and a half inches in diameter, should be placed quite near the top. To hollow out the log it is best to cut it in half lengthwise and then with a gouge or chisel shape out the cavity into a pear shaped hollow extending sixteen inches below the entrance hole making half the cavity in each piece of the log and the big end towards the bottom. Place the pieces together again and fasten tightly with a piece of soft wire at either ends of the log; then cut the top of the log sloping, with the back about one inch higher than the front; then nail a piece of board to this having it extend fully three inches beyond the log on both sides and front thus forming a shelter to the entrance hole which is quite important.

Those who are interested in finding out about any special house will find complete directions for all houses in N. M. Ladd's "How to Make Friends with the Birds."

It is a good idea to place a mixture of sand and sawdust in all Woodpeckers' houses as they do not carry in nesting material. Fill the house about one third full, they will soon remove any surplus.

Don't make the mistake of making two compartments in the one house, as houses of this sort will seldom be occupied, and if occupied only one compartment will be used. Purple Martin houses are an exception to this rule. With these houses the more rooms or apartments, each with a separate en-

trance, the better your house.

The placing of bird houses is very important. Care should be taken in selecting suitable locations which should be in open places as far as possible. When hanging the house see that the entrance faces the sheltered aspect, and that it is shaded from wet and storm as much as possible.

All houses should be cleaned and repaired as early as possible each season.

Don't make the mistake of placing a Flicker and Wren house on the same tree as if these should both be lucky in attracting occupants the Wren will take the first opportunity of visiting the Flicker's nest in the absence of the owner and puncturing the eggs. This happened in my garden last season, not only in the Flicker's nest but also with a Robin's nest which was built in the same tree.

Hang out wadding, wool, bits of string, and any other nesting material. Do this early as it is often the means of attracting a pair of birds to nest in your garden.

A bird bath is a splendid attraction. This should be placed in the open thus affording the birds a clear view of any approaching enemies, such as the skulking cat. A bath with a graded bottom is preferable. This should start at half inch and slope gently to not deeper than two inches. A fine misty spray is a splendid addition, also have perching accommodation nearby. A dust bath located in a sunny situation is much enjoyed by birds. This can be easily made by filling a flat tray or box say two or three inches deep with any sort of fine dust, preferably fine sand, with a small portion of slacked lime thoroughly mixed. A bath which will be much frequented especially by Robins and Sparrows can easily be made by securing a large plant saucer and placing it in a sunny location on a box or stool to raise it one or two feet from the ground, the only difficulty with this is that you will probably find that you will have to fill it several times during the day, as an enthusiastic Robin will splash considerable of the water over the edge and when this is repeated several times the bath soon becomes empty.

Besides serving as baths these basins of water are a great blessing in hot weather, as drinking pools, and if kept regularly filled will be visited by hundreds of birds during one day.

There is one golden rule to be observed if we are to make the birds feel perfectly at home in our gardens, that is that no cat or dog be allowed to roam about the premises. The proprietor must see that this is obeyed. Our movements have considerable effect on wild life. If we are gentle and even in our ways of going about the garden, and are not always appearing to be prying after the birds we will find that they will soon learn to treat us as friends. There is no better illustration of this than

with the Humming Bird. We all know how alert and absolutely instantaneous these birds are in their movements and yet, if approached in a gentle even way it is quite possible to gain their complete confidence. I have used an artificial flower made of bright paper, with a small bottle as a centre, filling the bottle with a mixture of honey and water, and by first letting them get acquainted with the special quality of the nectar of this rare flower have afterwards been able to have them come to my hand and sip from the bottle without any decoration. My experiments have been mostly carried on in the fall, and I am inclined to think that it would be a far more difficult proposition to tame these birds during the nesting season. This would apply to almost all birds as nature has made them specially timid and watchful during the time they are rearing their young.

Early in September it is well to hang out some feeding devices so as to attract any birds that might be persuaded to stay for the winter, and as with nesting materials it is a good plan to have them out early, however, just here I would like to say that it is far better not to start feeding the birds if we are not determined to do it regularly throughout the winter.

The feeding of birds in the winter is perhaps one of the most interesting sides of bird study. As already stated we must have some thick clumps or hedges of evergreen trees for protection if we are to be successful in keeping the birds about our gardens during the winter, but with this and careful regular feeding it is wonderful what can be done along this line. A feeding station arranged at a suitable window is certainly a source of great enjoyment during the long winter months. I would like to explain some of the feeding devices which I have found successful, also some methods of taming the birds and preparing their food.

Having selected our favorite window our aim will now be to entice as many birds as possible to this spot. If we are fortunate enough to have one or more trees within ten or twenty feet of the window we will find this a great aid. A brush pile say about ten feet from the window is necessary, as birds do not feel comfortable without a certain amount of cover. The larger this is the better. Another very good thing is to place artificially a good thick evergreen tree which will serve as a wind break and also make the birds feel more at home. There should be pieces of fat hung or fastened to trees for some distance around. Always have the best supply at your feeding station. It will not be long before you are rewarded with the arrival of a Downy Woodpecker, a Nuthatch, or a Chickadee. Once the birds have found your station all outlying feeding places should be abandoned. If you

are ambitious, you will frame up your window with rough branches and make an artificial window sill of a rough board, say about twelve inches wide, your reason for doing this is to have a place for the birds to feed should you be successful in getting them tame enough to come to the window. At first the birds will be quite shy, but if you are careful not to frighten them at any time they will soon become comparatively tame.

A splendid device for taming some of the more timid birds is a wire strung from the top of your window frame to the nearest tree, the outer end should be a foot or two higher than the end at the window so as to give the wire a slight slope down to the window. This will give anything that is hung on the wire a tendency to shift towards the window instead of further away as would otherwise be the case. The wire must be strung quite tightly so as not to sag when it is carrying its load. Now the idea is to hang feeding devices on this wire, first at the farther end and when the birds have become used to going to them, gradually shift closer to the window. In this way it is possible to get many quite shy birds to feed from your window sill. We have succeeded in getting the Cardinals to feed from our window sill in this way.

At first it may be found a good idea to sprinkle coarse grains such as oats, corn and perhaps some finer seeds, say millet, hemp, etc., in a specially prepared spot in your brush pile, but this will probably attract more house sparrows than anything else, and if you do not resort to some means of outwitting them they will soon monopolize your station, eating everything you exhibit excepting the whole corn.

Generally speaking you can divide the birds that will feed at your station into two classes, the seed eaters and the suet or fat eaters. This division is not absolute, but the Sparrows, Juncoes, Finches, and Cardinals, are preferably seed eaters. The Chickadees, Nuthatches, and Woodpeckers prefer suet or fat, while the Bluejay will do ample justice to either if it gets the chance.

The Chickadees are probably the most interesting and most easily tamed of our guests and our station would indeed be quiet without them.

The nature of a bird is to fly away as soon as it secures a morsel that is good to eat; now recognizing this fact and remembering that our object is to tame and see as much of the birds as possible, we should guard against this. How? Well, when putting out suet don't put out suet, but buy beef fat. Of course I do not need to explain this to the ladies but to the men I would say that suet crumbles and breaks up into pieces just suitable for the birds to fly away with, while beef fat holds together and requires that each mouthful be pecked off. Result—

bird has to stay on the job in order to get a meal. Also in putting out nuts for the Chickadees and Nuthatches see that these are reduced to a fine powder.

You will have special spots for your fat. The best way to fix this is to take a nail, say a three inch nail, cut the head off thus making a point at both ends, drive one end into the tree or the place where the fat is to be put, leaving the longer portion sticking out and sloping upward. The fat can easily be shoved on to this spike which will remain permanently in position.

To tame birds it is necessary to proceed by slow degrees. The birds must first become familiar with the general surroundings, and then they can be gradually brought to the window by getting them acquainted with a special feeding dish, and placing this a little nearer the window each day. After they have become accustomed to the window sill they can be tamed to feed from the hand by proceeding in the same slow, progressive way. If we are to keep the birds continually about we must have some feeding devices which will keep a supply of food always accessible.

A seed or grain hopper surrounded by a covered tray is a device which should be at every feeding station.

Mr. W. Saunders' upside-down feeding slab is contrived to protect the food from snow and rain. I have made one by fastening cork bark to a piece of board, this bark being very rough is especially adaptable for the purpose.

The fat is slightly warm and is then pressed into all the holes and crevices of the bark. This slab is much used by Chickadees, Nuthatches and Woodpeckers, and is indispensable in rough weather.

An exceedingly useful addition to our outfit is a variant of Mr. Saunders' upside-down feeding slab; this is made by adding sides about one inch deep to

the plain board. This when filled with melted fat, and nuts, if desired, provides a large bulk of food.

The wired dish is a new idea which has been tested only this winter. It is the invention of Mrs. J. S. Berry, and her experience, which tallies with my own, is that the Chickadees enter it with perfect fearlessness.

The chief point in this dish is that the meshes formed by the crossing wires will admit a Chickadee but are too small to admit a Sparrow.

The bird curate is the most satisfactory of all our feeding appliances, for the reason that it affords such ample accommodation. It is no uncommon thing to have twelve to fifteen birds feeding at once on the different sections. To secure this it is of course necessary to use finely powdered food, which requires that the bird stay on the spot in order to get a meal. This accustoms them to our person and our movements and has a great influence in taming them.

The feeding log is another of Mr. Saunders' inventions, the essential principle of which is that it shall hang by string or wire so that it oscillates with the breeze or the motion of the birds. Sparrows have a decided objection to feeding from a moving object, and until they cure themselves of this idiosyncrasy we can take advantage of it to avoid having them steal the expensive food that we provide for our native friends. There remains the additional advantage that we can use these sparrow-proof devices further down in the garden, until such time as the Sparrows decide to assist in the destruction of the food thus provided.

Have a feeding station. The birds will repay your kindness with their friendly confidence. Making friends with the birds brings us closer to the great world of nature about us, which is so full of wonderful blessings.





Commission of Conservation

PUFFINS ON LEDGE OF BONAVENTURE ISLAND (Not Razor-billed Auks).
Photo by Geological Survey—Courtesy of Commission of Conservation, Canada.

NOTES ON THE SUMMER BIRDS OF THE GASPE PENINSULA.

BY CHARLES W. TOWNSEND, M.D., BOSTON.

(Continued from Vol. XXXIV, page 80.)

The adults on alighting near their half grown young empty their stomach contents on the ground and the young eagerly swallow it. The young may often be seen practicing short flights on the top of the Rock, but when they once launch out from their nesting place they roost on the broken rock and beaches at the foot of the cliffs.

9. *Larus philadelphia*. Bonaparte's Gull.
On August 14th I saw two adults and four immature birds of this species in the Gaspé Basin, evidently migrants.

10. *Sterna hirundo*. Common Tern.
The only birds of this species I saw anywhere along the coast of the Peninsula were about a dozen at Cross Point on July 5th. Mr. Taverner does not note them.

11. *Hydrochelidon nigra surinamensis*. Black Tern.
One seen August 27th in the lower part of the York River near Gaspé.

12. *Oceanodroma leucorhoa*. Leach's Petrel.
Breeding commonly in the clefts and holes in the top of the Gannet cliffs at Bonaventure Island.

13. *Sula bassana*. Gannet.
As already stated about 8,000 Gannets breed in the cliffs on the eastern side of Bonaventure Island. The great majority of the birds seen were in full adult plumage; about one in three or four hundred had black in the base of the wing, in the tail and scattered over the back. These, I suppose, are birds two years old.

Early in July nearly all the eggs had hatched, but I watched an adult on July 18th which was brooding an egg in the nest. When the bird raised itself I saw that one webbed foot nearly covered the egg. This singular habit has been noted in literature.

From time to time adults could be seen bringing rockweed in their bills and patching up their nests. The nests like the ledges were painted white with the droppings of the birds. The white downy young with black faces grew rapidly between the time of my first visit on July 10th and my last on August 3rd when they were nearly half as large as their parents.

The curious courtship ritual I have described at length in my paper on Courtship in Birds⁵. This always takes place when a bird arrives at the nest to relieve its mate. It is evident that the sexes al-

ternate in feeding and brooding the young. The new arrival at the nest, after its mate has left, waddles around so that the young is in front of her breast. The young at once raises its black head and shows by its vibrating throat that it is calling for food. The parent often appears indifferent, preens her own feathers and the down of her offspring, gapes sleepily and darts her head angrily at a neighbor. The young become more insistent and tries to wedge open the bill of its mother. She at last gives a gulp, curves her head down, opens wide her bill and appears to swallow the head and neck of her hopeful. The process is soon repeated; the young always seem ready to disappear into the cavern of its parent's mouth.

Whether the great volume of noise that goes out from this ledge is the courtship song or not I can not say, but it is doubtless augmented by the calling of the young for food. It suggests thousands of rattling looms in a great factory, a rough vibrating pulsing sound, and may be written down *car-ra, car-ra, car-ra*.

Taking advantage of the strong sea breezes and of the currents deflected upwards by the cliffs, the Gannet is able to soar on rigidly outstretched wings for a long time without flapping. One, which I watched passing within a few yards of me, circled ten times to within a few feet of a ledge crowded with its kind, and each time he dropped his feet as if about to alight, but each time drew them up again and sailed by. Except for a momentary flutter just before each attempt to alight, his wings were held rigidly outstretched. The circle was one of three or four hundred yards in diameter. On each of the last three times he executed a smaller circle in addition, thus completing a figure of eight. On the eleventh attempt he dropped suddenly on the ledge close to his mate on her nest. The bill-shaking and bowing and caressing that went on was in the most spontaneous and eager fashion. They appeared over-joyed to meet again.

Before flying from the ledge the Gannet generally poises motionless for several moments with its eyes and bill pointed upwards, perhaps in order to watch for an opportunity to fly without colliding with another bird in the air. It then leaps clear of its companions and of the ledge, and with tail turned down as a brake, it swiftly descends until it gathers impetus enough to rise.

At Grand Grève in the early part of August I frequently saw Gannets singly or in groups of two

and threes fly back and forth in Gaspé Bay. During the latter part of the month they were flying south. I did not see any fly over the land.

14. *Phalacrocorax auritus auritus*. Double-crested Cormorant.

A very abundant bird all along the coast. It breeds to the number of about 2,000 on top of Percé Rock and in large numbers on the great

abundant species and grows luxuriantly.

The feeding of the partly-grown and especially of the fully-grown young Cormorant was always an amusing spectacle. An adult alighting on the rock is at once besieged by one or more young who wave their wings frantically and raise their heads, beseeching the parent for food. Often times the parent is reluctant to accede to the request and runs away,



GENERAL VIEW OF GANNET LEDGES, BONAVENTURE ISLAND, 1914.
Photo by Geological Survey of Canada —Courtesy of
Commission of Conservation, Canada.

sea cliffs at Bon Ami and at the foot of Mt. St. Albans.

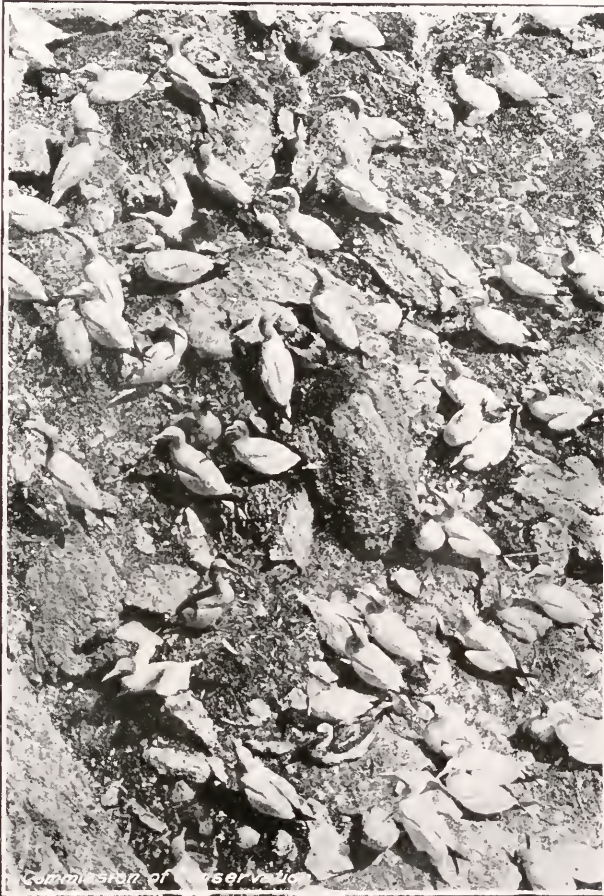
At Percé Rock there appeared to be seventeen distinct clusters of nests where everything including the nests was painted white with droppings and the ground was devoid of vegetation. Where the Herring Gulls nest the surface is largely covered with vegetation. Yarrow, *Achillea borealis*, appears to be the most

closely pursued by its offspring, dodging in and out among the other Cormorants and Gulls. Finally the parent gives in, opens its capacious maw into which the young disappears as far as its head and neck are concerned. The parent gradually lowers its head as the young pushes in, and finally bring it nearly to the ground. The young, meanwhile, flaps its wings violently, and the picture is of a large bird trying hard to swallow another bird of the same

size who struggles violently in protest. It frequently happens that, after repeated requests for food, the parent, unable to rid itself of the tormenting young, takes refuge in flight.

The young when fully grown may often be seen practicing flight by ascending a few feet into the air and coming back to the rock. The earliest descent by the young to the water took place the last of July.

that they stand out as light patches on the gray rock, while the birds themselves look like black bottles. During my stay at Grand Grève during the month of August an almost continuous stream of these birds was passing and repassing over the little settlement, the birds were going to their feeding grounds in the Gaspé Basin and York and Dartmouth Rivers and returning to their nests. They passed singly and in companies of two or three up



CLOSE-UP VIEW OF GANNETS ON LEDGES OF
BONAVENTURE ISLAND, 1914.

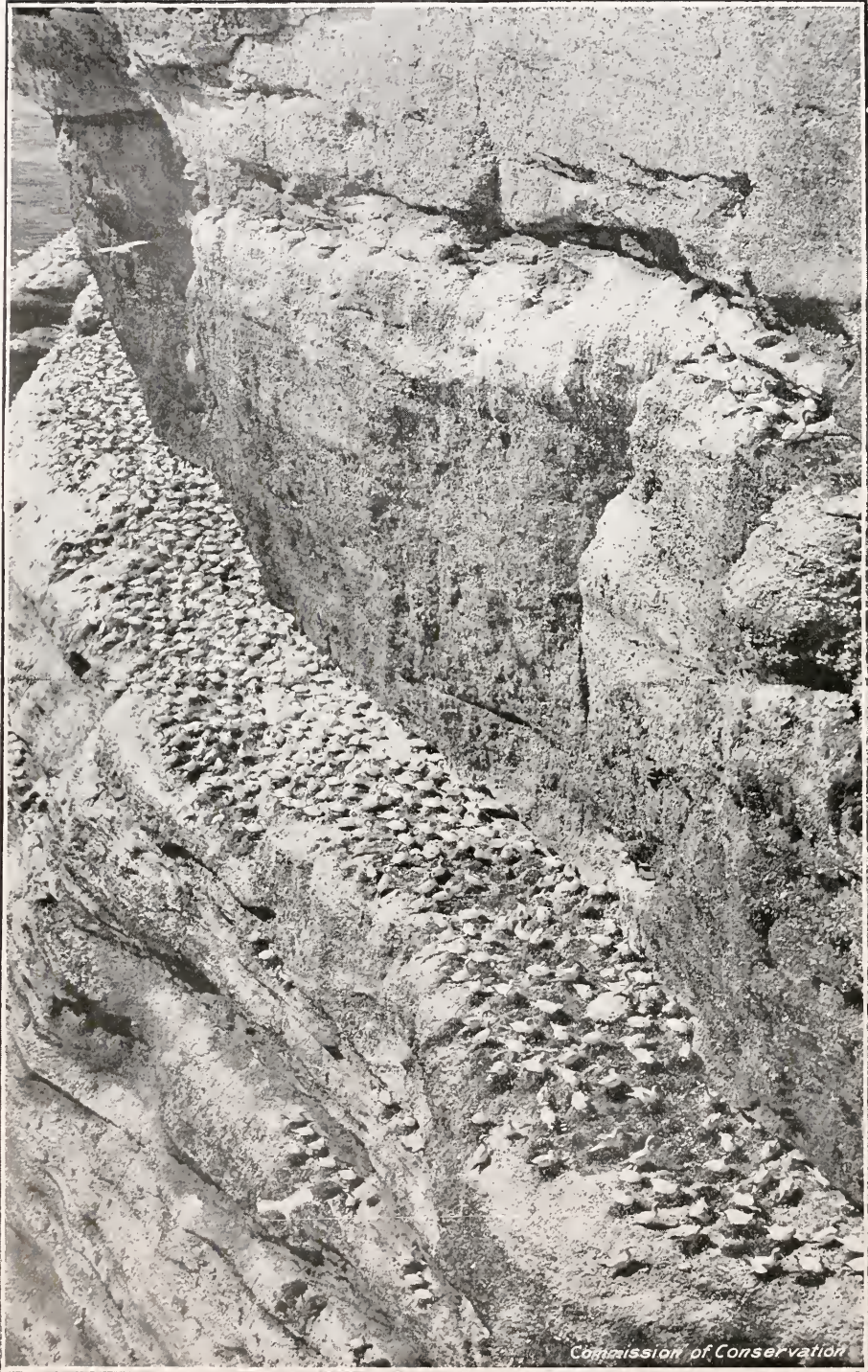
Photo by Geological Survey—Courtesy of Commission
of Conservation, Canada.

The great cliffs, which rise from the water to a height of six or seven hundred feet and extend along the shore for four or five miles near Mt. St. Albans and Cape Bon Ami on the north side of the Forillon back of Grande Grève are nearly perpendicular and possess but few shelves for foothold. On these are built the nests of this species and they are so plastered with the white guano of the bird

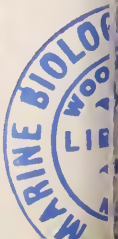
to thirty or forty. In warm weather most of the birds had their mouths open, but in cool weather they were shut. I looked carefully for *carbo* but all were *auritus*.

During August groups of a hundred or more fully grown young birds were to be seen on the little pocket beaches at the foot of the Bon Ami cliffs.

The fishermen dislike this bird as they say it



GREAT GANNET LEDGE. BONAVENTURE ISLAND, GASPE CO., QUE.
Photo by Geological Survey—Courtesy of Commission of Conservation, Canada.



takes herrings on which they depend for bait, from their nets. I saw no shooting, but on the York River there were steel traps on posts and a few birds had suffered a lingering death.

Mr. Taverner found two nesting colonies of this species in Gaspé Bay, one on Gull cliffs on the south side, the other on the north side at Three Runs. Here the nests, about thirty in number, were built in birch trees growing in crevices in the cliffs.

15. *Mergus serrator*. Red-breasted Merganser.
A flock of 20, seen at the mouth of the York River on August 27th.
16. *Anas rubripes tristis*. Black Duck.
A number seen in the Gaspé Basin and the mouth of the York River the latter part of August. Mr. Taverner found them there with young.
17. *Spatula clypeata*. Shoveller.
A bird probably of this species from the description given to Mr. Taverner, was shot at Cape Cove in June, 1915.
18. *Aix sponsa*. Wood Duck.
Mr. Taverner found a mounted specimen at Gaspé taken in the vicinity.
19. *Clangula clangula americana*. Golden-eye Duck.
Thirteen young with their mother were found on the upper Gaspé Basin by Mr. Taverner on July 29, 1914.
20. *Harelda hyemalis*. Old Squaw.
Small flocks were seen near Bonaventure Island in 1915 by Mr. Taverner. One was taken July 22nd.
21. *Histrionicus histrionicus*. Harlequin Duck.
In June and July, 1915, on three occasions bunches of three to seven were seen near Bonaventure Island by Mr. Taverner. Three were taken, all with undeveloped genitalia.
22. *Oidemia americana*. Scoter.
23. *Oidemia deglandi*. White-winged Scoter.
24. *Oidemia perspicillata*. Surf Scoter.
A few of each of these species, evidently migrants, were seen during the latter part of August.
25. *Botarus lentiginosus*. Bittern.
I saw two on the York River on August 27th.
26. *Ardea herodias herodias*. Great-blue Heron.
From the train on July 7th I saw numerous birds of this species in the tidal flats near Point au Garde. At Douglastown on August 21st I counted twenty-four behind the barachois. On the York River on August 27th there were eight.
27. *Nycticorax nycticorax naevius*. Black-crowned Night Heron.
Mr. Taverner and I each saw a single bird at Percé. He found it common at Gaspé.
28. *Gallinula galeata*. Florida Gallinule.
Mr. Taverner saw a mounted bird at Gaspé taken in the vicinity.
29. *Lobipes lobatus*. Northern Phalarope.
Mr. Brewster saw this species near Percé in July, 1881.
30. *Philohela minor*. Woodcock.
Mr. Brewster reported one near Gaspé in 1881, and Mr. Taverner heard of another shot there.
31. *Pisobia minutilla*. Least Sandpiper.
Common migrant.
32. *Ereunetes pusillus*. Semipalmated Sandpiper.
Only a very few seen.
33. *Calidris leucophaea*.
One was seen on August 21st at Douglastown. There are very few suitable grounds for shore birds on the Gaspé Coast.
34. *Totanus melanoleucus*. Greater-yellow legs.
A number seen back of the barachois at Douglastown and on the flats about the York River.
35. *Actitis macularius*. Spotted Sandpiper.
Common all along the shore. At Bonaventure Island a pair, evidently having eggs or young near our camp, flew about nervously and alighted from time to time in the tops of low spruce trees.
36. *Numenius hudsonicus*. Hudsonian Curlew.
A few migrants seen.
37. *Squatarola squatarola*. Black-bellied Plover.
On August 21st I saw two flocks of a dozen each feeding back of the barachois at Douglastown in the brackish marshes.
38. *Aegialitis semipalmata*. Semipalmated Plover.
A few migrants seen.
39. *Arenaria interpres morinella*. Ruddy Turnstone.
A few migrants recorded by Mr. Taverner.
40. *Bonasa umbellus togata*. Canada Ruffed Grouse.
A few with young seen near Percé.
41. *Circus hudsonius*. Marsh Hawk.
One seen at Bonaventure Island and several on the Forillon.
42. *Accipiter velox*. Sharp-shinned Hawk.
A few seen near Grande Grève.
43. *Buteo borealis borealis*. Red-tailed Hawk.
During the latter part of August there was a small southward migration of these hawks.

44. *Buteo platypterus*. Broad-winged Hawk.
I clearly identified one of these at Grande Grève on August 24th, and saw the same one or another there the following day.
45. *Archibuteo lagopus sancti-johannis*. Rough-legged Hawk.
One seen at Grande Grève on August 19.
46. *Haliaeetus leucocephalus alascanus*. Northern Bald Eagle.
Four of these birds in immature plumage were flying about a rocky crag in the woods of Cross Point on July 7th.
47. *Falco peregrinus anatum*. Duck Hawk.
A pair of these birds evidently nested near the Pic d'Aurore at Percé.
48. *Falco columbarius columbarius*. Pigeon Hawk.
One seen at Cannes des Roches,—one near Percé and two or three near Grande Grève.
49. *Falco sparverius*. Sparrow Hawk.
One seen from the train near Nouvelle on August 28.
50. *Pandion haliaetus carolinensis*. Osprey.
A few all along the coast. Between Grande Grève and Gaspé I counted six, and six in a day's trip on the York River.
51. *Ceryle alcyon*. Belted Kingfisher.
A few seen along the coast.
52. *Dryobates pubescens* sub. sp. Downy Woodpecker.
A few seen. Mr. Taverner secured a single specimen at Gaspé. Its measurements are,—wing 96; tail 62; culmen 16; tarsus 15.
53. *Sphyrapicus varius varius*. Yellow-bellied Sapsucker.
One seen at Cross Point and their markings on trees seen elsewhere.
54. *Colaptes auratus luteus*. Northern Flicker.
Not uncommon at all stations.
55. *Chordeiles virginianus virginianus*. Nighthawk.
One seen at Cross Point by me and a few at Gaspé by Mr. Taverner.
56. *Chaetura pelagica*. Chimney Swift.
One seen at Cascapedia and Mr. Taverner reported a pair at Percé in 1915.
57. *Archilochus colubris*. Ruby-throated Hummingbird.
Mr. Taverner saw one at Percé in 1915. I saw one at Corner of the Beach and another at Grande Grève.
58. *Tyrannus tyrannus*. Kingbird.
One was noted by Mr. Taverner at Percé on June 10, 1915.
59. *Empidonax flaviventris*. Yellow-bellied Flycatcher.
Not uncommon.
60. *Empidonax traillii alnorum*. Alder Flycatcher.
A few seen and heard in song at Percé.
61. *Cyanocitta cristata cristata*. Blue Jay.
One was noted at Percé by Mr. Taverner on July 4th, 1914 and July 28, 1915, and one was seen by Judge C. F. Jenny in 1911 at Percé.
62. *Persisorcus canadensis canadensis*. Canada Jay.
One seen at Bonaventure Island on July 9th, 1914 by Mr. Taverner.
63. *Corvus corax principalis*. Northern Raven.
At least one pair at Percé and another at Grande Grève. A family were always to be seen about the cliffs at the Grande Coupe at Percé and the birds flew back and forth to the cliffs of the Murailles and Pic d'Aurore. Here they were continually set upon by Herring Gulls. The cause of the animosity on the part of the latter bird was evident, for Mr. Taverner records that a Raven was seen on the cliffs of Grande Coupe in 1915 feeding its offspring with a young Herring Gull. The flight of the Ravens about Pic d'Aurore was extremely graceful. In the strong sea breeze they often rose from near the sea to the summit of the peak, 700 ft. without apparent movement of the wings.
64. *Corvus brachyrhynchos brachyrhynchos*. Crow.
Common everywhere and as tame and easily approached as I have found them at Cape Breton. At Percé I saw two Crows feeding in a field of young barley within thirty yards of a realistic scare-crow. They were often seen on fence posts and out-buildings and they often fed on the fish heads, and entrails spread on the land as fertilizer. At Barachois on July 26th I saw about a hundred crows on the beach near the fish-splitting tables and alighting on the fishing boats. Here they took the part of the Herring Gulls at Percé and elsewhere.
65. *Molothrus ater ater*. Cowbird.
One in immature plumage was seen at King George Cove near Grande Grève on August 25th.
66. *Sturnella magna magna*. Meadowlark.
One was reported by Mr. Taverner as seen at Percé about June 10, 1915.
67. *Quiscalus quiscula aeneus*. Bronzed Grackle.
I am inclined to think this is a recent arrival in the Gaspé Peninsula. I was told both at Percé and Grande Grève that these birds had been seen in the last few years only. In 1914, Mr. Taverner saw a few at Gaspé but none at Percé. In 1915 he saw a few evidently nest-

- ing just to the south of Percé. In 1919 I found a dozen or more spending the summer in Percé also at Grande Grève, and I saw a flock of 50 or 60 near the marshes of the York River. I was told that they had become a great pest at Grande Grève as a flock would descend on a newly planted grain field and root up the grain.
68. *Pinicola enucleator leucura*. Pine Grosbeak.
On July 16, 1915, Mr. Taverner gives a doubtful record of this bird. I saw single birds several times at Percé and Grande Grève.
 69. *Carpodacus purpureus purpureus*. Purple Finch.
Common, breeding.
 70. *Loxia curvirostra minor*. Crossbill.
A flock of a dozen seen near Percé on July 30.
 71. *Loxia leucoptera*. White-winged Crossbill.
On June 26th, 1914, Mr. Taverner saw a large flock of these birds near Percé and secured one. Later a flock of 100 to 150 were continually moving about. I saw only one, an adult, at Percé on July 9th.
 72. *Astragalinus tristis tristis*. Goldfinch.
Abundant everywhere. If the species depends here on thistle-down for nest construction it must needs wait until the end of August.
 73. *Spinus pinus*. Pine Siskin.
The most abundant passerine bird. Seen everywhere in flocks during July and August. Mr. Taverner found a nest and eggs on July 21st, 1915.
 74. *Passerculus sandwichensis savanna*. Savannah Sparrow.
Very common breeder in open fields everywhere.
 75. *Zonotrichia leucophrys leucophrys*. White-crowned Sparrow.
One was seen by Mr. Taverner at Percé on June 21st, 1914, evidently a late migrant towards the north. This is the only record.
 76. *Zonotrichia albicollis*. White-throated Sparrow.
Abundant breeder everywhere.
 77. *Spizella passerina passerina*. Chipping Sparrow.
Common at both Percé and Grande Grève. Feeding young at latter place on August 7th.
 78. *Junco hyemalis hyemalis*. Slate-coloured Junco.
Very common breeder.
 79. *Melospiza melodia melodia*. Song Sparrow.
Common breeder both at Percé and Grande Grève.
 80. *Melospiza lincolni lincolni*. Lincoln's Sparrow.
Mr. Taverner shot a bird of this species at Gaspé on July 28th, 1914, but has no other record of it. I had found the bird in crossing New Brunswick on my way to the Gaspé Peninsula but although I looked for it everywhere there I did not find it.
 81. *Passerella iliaca iliaca*. Fox Sparrow.
Mr. Taverner has only one doubtful record of this bird at Percé. Messrs. R. B. Mackintosh and A. A. Osborne saw one there on July 14, 1915. I saw the bird not uncommonly at Percé and heard it singing through July and as late as August 1st. There were at least three pairs at Bonaventure Island. I did not find it at Grande Grève, but the song season was then over.
 82. *Petrochelidon lunifrons lunifrons*. Cliff Swallow.
This was the common Swallow, nesting everywhere under the eaves of buildings.
 83. *Hirundo erythrogastra*. Barn Swallow.
A few seen both by Mr. Taverner and me. I did not see any until August 3rd, evidently migrants.
 84. *Iridoprocne bicolor*. Tree Swallow.
I saw two or three at Cross Point and at Gaspé. Mr. Taverner saw a few.
 85. *Riparia riparia*. Bank Swallow.
A very few of this species were seen and those not till late in the season.
 86. *Bombycilla cedrorum*. Cedar Waxwing.
A few were seen by Mr. Taverner in Percé in 1914.
 87. *Lanius borealis*. Northern Shrike.
On August 18 I saw one of this species at Grande Grève.
 88. *Vireosylva olivacea*. Red-eyed Vireo.
I found a few of these birds at Cross Point and at Percé. Mr. Taverner took a specimen at Percé.
 89. *Vireosylva philadelphia*. Philadelphia Vireo.
At Percé on July 14th I had a momentary view of a bird that I believed to be of this species and I determined to follow up any vireo I heard singing. On July 21st in the gorge of the Grande Chute near Percé I heard a song resembling that of the Red-eyed, but not so continuous, the phrases were more distinct. I succeeded in seeing the bird within about fifteen yards and discovered that it was a Philadelphia Vireo.
 90. *Lanivereo solitarius solitarius*. Blue-headed Vireo.
One heard singing at Cross Point on July 5th, and one seen at Grande Grève on August 20th.



PERCE ROCK, QUE.

Courtesy of the American Museum of Natural History.



PERCE VILLAGE, QUE., WITH PERCE ROCK AND BONAVENTURE ISLAND
IN THE DISTANCE.

Courtesy of the American Museum of Natural History.

91. *Mniotilta varia*. Black and White Warbler.
Two were seen at Cross Point.
92. *Vermivora peregrina*. Tennessee Warbler.
A very common bird at both Cross Point and Percé and in full song. Mr. Taverner took several nests.
93. *Compsothlypis americana usneae*. Northern Parula Warbler.
One observed at Cross Point.
94. *Dendroica tigrina*. Cape May Warbler.
A few were seen by Mr. Taverner in 1914 and 1915. I saw one at Percé on August 2nd.
95. *Dendroica aestiva aestiva*. Yellow Warbler.
One was seen at Percé on July 14, 1915 by Mr. Mackintosh. I saw several at Cross Point and two or three at Percé. Mr. Taverner observed two at Gaspé.
96. *Dendroica caerulescens caerulescens*. Black-throated Blue Warbler. The only record is of one bird seen by me at Grande Grève on August 16th.
97. *Dendroica coronata*. Myrtle Warbler.
A rather common breeder.
98. *Dendroica magnolia*. Magnolia Warbler.
A very common bird everywhere.
99. *Dendroica castanea*. Bay-breasted Warbler.
Not uncommon.
100. *Dendroica striata*. Black-poll Warbler.
Abundant. Mr. Taverner found nests.
101. *Dendroica fusca*. Blackburnian Warbler.
A few were seen.
102. *Dendroica virens*. Black-throated Green Warbler.
Common.
103. *Dendroica palmarum hypochrysea*. Yellow Palm Warbler.
One was seen at Percé on June 10, 1915 by Mr. Taverner.
104. *Seiurus aurocapillus*. Oven-bird.
I found this bird not uncommon at Cross Point but did not see it elsewhere. Mr. Taverner did not observe it.
105. *Seiurus noveboracensis noveboracensis*. Water Thrush.
I found one of these in full song at Cross Point on July 5th and on August 17th and 19th saw one at Grande Grève.
106. *Oporornis philadelphia*. Mourning Warbler.
I saw one at Cross Point on July 5th.
107. *Geothlypis trichas trichas*. Maryland Yellowthroat.
I found a few of this species at Cross Point, but none elsewhere. Mr. Taverner does not record it.
108. *Wilsonia pusilla pusilla*. Wilson's Warbler.
Mr. Taverner does not record it in 1914 but in 1915 says "Not uncommon and seen in occasional individuals throughout our stay. Undoubtedly breeds." I saw none.
109. *Setophaga ruticilla*. Redstart.
Not uncommon.
110. *Nannas hiemalis hiemalis*. Winter Wren.
Not uncommon.
111. *Certhia familiaris americana*. Brown Creeper.
One seen at Grande Grève on August 8th.
112. *Sitta canadensis*. Red-breasted Nuthatch.
Not uncommon after August 6th at Grande Grève. The earliest seen by Mr. Taverner was July 29th.
113. *Penthestes atricapillus atricapillus*. Chickadee.
I saw two or three at Cross Point and also at Grande Grève.
114. *Penthestes hudsonicus littoralis*. Acadian Chickadee.
Not uncommon at Percé and at Grande Grève. Mr. Taverner secured four specimens. They belong to this subspecies. He also saw nestlings fed by parents.
115. *Regulus satrapa satrapa*. Golden-crowned Kinglet.
A few seen at Gaspé during August. Mr. Taverner found nestlings fed by parents.
116. *Regulus calendula calendula*. Ruby-crowned Kinglet.
One was seen at Grande Grève on August 16th. Mr. Taverner reports a flock of about ten of this species on July 24th, 1914, at Gaspé.
117. *Hylocichla fuscescens fuscescens*. Veery.
I heard three singing at Cross Point on July 5th.
118. *Hylocichla aliciae aliciae*. Gray-cheeked Thrush.
Mr. Taverner took one of this species on July 16th, 1914, at Percé. I saw one at Percé on July 13th, and heard its calls answered by another.
119. *Hylocichla ustulata swainsoni*. Olive-backed Thrush.
Common everywhere and singing until the middle of July.
120. *Hylocichla guttata pallasii*. Hermit Thrush.
A few at Cross Point and Percé.
121. *Planesticus migratorius migratorius*. Robin.
Common everywhere.

THE DIVING HABIT AND COMMUNITY SPIRIT OF THE SPOTTED SANDPIPER.

BY H. MOUSLEY, HATLEY, QUE.

In the "Ottawa Naturalist," for September, 1918, page 56, Mr. John D. Tothill gives an instance whilst out canoeing on the Restigouche River, of the diving of this small Sandpiper to avoid pursuit by a hungry Pigeon Hawk (*Falco columbarius*) and speaks of the behaviour as being unusual. I remember being equally surprised on first witnessing this habit some few years ago at Hatley. On that occasion I had shot an immature bird which fell at the edge of the water, but on proceeding to the spot to pick it up as I thought, was surprised to see it wade out into the water, where after getting out of its depth it sank to the bottom, and by means of its wings and feet proceeded to travel at a great rate under the water to a small mud bank, where it came to the surface and hid in the surrounding rushes. (See "The Auk," Vol. xxxiii, 1916, p. 66.)

That this wading, swimming and diving habit is by no means so unusual as most people imagine, seems to be borne out by the experience of others, for Dr. Warren notes that a young bird when wounded took to the water in a shallow stream, went to the bottom like a stone, ran across on the bottom, and coming up on the other side endeavoured to conceal itself by submerging its body and pushing its head among long grass growing at the water's edge. In September, 1876, Mr. E. H. Forbush saw a wounded bird of this species when pursued, dive into deep water from the shore of the Charles River and fly off under water, using its wings somewhat as a bird would use them in the air. All its plumage was covered with bubbles of air, which caught the light until the bird appeared as if studded with sparkling gems as it sped away into the depths of the dark river. (See "Game Birds, Wild Fowl and Shore Birds," Forbush, 1912, p. 323, where Dr. Warren's experience is also recorded). Dr. Charles W. Townsend remarks in his "Birds of Essex County," 1905, p. 188, that the young birds, while still covered with natal down, run very fast and when hard pressed, take to the water and swim rapidly and easily.

Regarding the community spirit of this restless little Sandpiper, the same author speaks of its being particularly fond of nesting on islands, and that in the late seventies he used to find the eggs at Kettle Island off Magnolia, whilst Mr. W. A. Jeffries found eleven nests with eggs, and one with young at Tinker's Island, off Marblehead, on June 8, 1878. Four nests were in the short grass on high land, while the others were all found more or less far under the rocks scattered over the grass or along the shore.

Nuttall in his "Manual of the Ornithology of the United States and Canada," 1834, Vol. 2, p. 164, speaks of their nesting at Egg Rock off Nahant, in the immediate vicinity of the noisy nurseries of the quailing Terns. Mr. Julian K. Potter, writing in "Bird Lore," Vol. xx, 1918, No. 4, pp. 282-284, says, "That the Spotted Sandpiper sometimes associates with others of its kind, and may be found breeding in a restricted area, is an established fact, but I believe, however, that this habit is the exception rather than the rule with these birds." He then goes on to relate how at the end of May, 1913, he found Spotted Sandpipers nesting in colonies within the city limits of Camden, N.J., as well as in the wilds of Pike County, Pa. In the former place six nests were found within an area of one fourth acre, whilst in the latter about twelve pairs (three nests were actually found) were thought to be breeding in quite a limited area.

As regards my own experience at Hatley, I have already recorded in "The Auk," that usually not less than six pairs used to nest on the margins of 'the marsh' some fifteen acres in extent, but of late years the numbers seem to have decreased. The most extraordinary case, however, of this community spirit and partiality for nesting on small islands is related by Mr. L. M. Terrill in his paper on "The changes in the status of certain birds in the vicinity of Montreal," "Ottawa Naturalist," Vol. xxx, 1911, p. 57, wherein he says, "Having seen no mention of gregarious habits attributed to this Sandpiper, it might be of interest to note that a few years ago a large colony were nesting on Isle Ronde (a small island of a few acres, opposite the city). Visiting this island on May 26, 1896, I located without difficulty thirteen occupied nests. Again on May 31, 1898, I examined upwards of twenty-five. On each occasion only a small portion of the island was examined and I estimated that there were well over one hundred pairs breeding."

In striking contrast to this might be mentioned my experience with the Common Sandpiper of Europe (*Tringa hypoleuca*) first cousin to our Spotted species, and a bird very like it not only in appearance but in general habits also. In the British Isles on the rivers Wharfe in Yorkshire, the Wye, Hamps, Manifold and Dove (the latter immortalized by Isaac Walton and Charles Cotton, the latter of whom calls her the "Princess of Rivers") all in Derbyshire, I have had ample opportunities of observing that instead of a community spirit existing the opposite seems to be the case, for there each pair of birds selects and monopolizes a certain

stretch of river, upon which no other pair appears to intrude. In conclusion it can truly be said that of the very intimate home life and traits of even our most common birds we know very little, and I have yet to see the text book that gives any definite in-

formation on the exact incubation period of the Spotted Sandpiper, which in the case of its cousin (*Tringa hypoleuca*) has only lately been ascertained to be twenty one days. See "British Birds," 1913, Vol. vii, p. 146.

WINTER BIRD LIST FROM LONDON, ONTARIO.

(SUBMITTED BY THE MCILWRAITH ORNITHOLOGICAL CLUB, THROUGH MR. E. M. S. DALE.)

Have other localities been as favored with birds as was London last winter? From January 1 to February 8, forty-one species were reported which is about twice the normal number.

As is the usual practice of our club members we took the 7.40 train to Hyde Park on New Year's morning and walked back to the city, a distance of probably six or seven miles, following roughly the course of the River Thames. We made a list of twenty-two species, and on the following Saturday, January 3, visiting practically the same district, made another list of eighteen, which included six not seen on New Year's Day. Since then "one at a time" has been the usual rule until we now have a total of forty-one as above mentioned. December was quite cold and snowy, and January decidedly so, the thermometer registering zero and below on many occasions, and a snowfall of upwards of two and one-half feet being registered for the month. The list in order of date is as follows:—

January 1. Brown Creeper, White-breasted Nuthatch, Red-breasted Nuthatch, Bluejay, American Crossbill, White-winged Crossbill, Black-capped Chickadee, American Goldeneye, American Merganser, Snowbird, Rusty Blackbird, Red-winged Blackbird, Song Sparrow, Downy Woodpecker, Pine Siskin, Junco, Golden-crowned Kinglet, Cardinal, Crow, Purple Finch, Tree Sparrow, White-throated Sparrow.

January 3. Hairy Woodpecker, Black Duck, Redpoll, Goldfinch, Northern Shrike, Kingfisher.

January 4. Hudsonian Chickadee.

January 5. Robin, Evening Grosbeak, Long-eared Owl.

January 11. Bronzed Grackle.

January 12. Sharp-shinned Hawk.

January 16. Coopers Hawk.

January 21. Screech Owl.

January 22. Yellow-bellied Sapsucker.

February 1. Ruffed Grouse.

February 6. Pine Grosbeak.

February 7. Herring Gull.

February 8. Red-shouldered Hawk.

The following notes on some of the species may be of interest.

American Crossbill.—Two rosy ones feeding quite low in a hemlock tree. Others have been seen since in Norway spruces.

White-winged Crossbill.—The flock of twelve or fifteen seen on New Year's Day were in a hemlock which seems to be the favorite food of these birds here. There were several rosy ones in the lot. White wings have not been reported since that date.

Cardinal.—Previous to 1910, Cardinals were of accidental or very casual occurrence here. Since that date they have been gradually increasing in numbers and are now fairly common. One winter one of our members had six or seven feeding at his place. They are a very welcome addition to our bird population.

Siskin.—Pine Siskins were unusually abundant this fall, and since winter set in an occasional flock of two have been seen.

Rusty Blackbird.—This and the Redwing have been keeping each other company at a point where a little stream (which looks and smells like sewage) enters the river. It is our first winter Rusty although Redwings have been recorded twice before.

White-throated Sparrow.—White-throats have stayed with us occasionally in winter, but this bird is living right in the heart of the city, being fed by friends and using a Norway spruce hedge for shelter. During December and early January it sang with spring time vigor, and would answer readily to a whistled imitation of its song.

Redpoll.—Redpolls are quite common this winter, hardly a trip being taken to the country when they were not recorded. They have been feeding almost exclusively on birch trees.

Hudsonian Chickadee.—Two specimens were taken by a collector near London, and at least two more have visited the food shelves of members of our Bird Club in different parts of the city.

Evening Grosbeak.—First reported by Mr. A. Wood near Coldstream, on January 5th. Since then a flock of some twenty-five have been seen by different parties in and near the city, as well as smaller flocks which may be part of the twenty-five.

Black Duck.—An unusual winter duck for us. Has been seen several times in the same locality.

Yellow-bellied Sapsucker.—First winter recorded.

NOTES AND OBSERVATIONS.

A 1919 CHRISTMAS CENSUS FOR TORONTO AND OTTAWA.—The Bird-Lore Christmas Census is well known. With a view to adding two more Canadian localities to the 1919 census, an excursion was made at Toronto on December 24th, and one at Ottawa, on December 26th.

Unfortunately the lists were submitted too late to be included in Bird-Lore, but as they give an idea of the bird population of the two places at almost the same time, they may be of interest.

Toronto, Ontario, route from High Park to Grenadier Pond, along shore of Lake Ontario to Humber Valley, up river and return by Bloor Street; December 24th; 1 p.m. to 4.30 p.m.; 5 inches snow; snowfall 1.5 inches; wind north-west 25 to 21 miles per hour; temperature 18.5 to 14.7 degrees F.; about 8 miles on foot; observers together.

Herring Gull 7, Loon 2, Chickadee 11, Hairy Woodpecker 1, (perhaps 2) Horned Grebe (?) 1, American Merganser 1, Black-backed Gull 1, Duck (?) 1, Scaup Duck 1, Song Sparrow 2, Tree Sparrow 1, Crossbill (?) 1, Redpoll 1. Total species about 13; individuals about 31.

Observers: Stuart L. Thompson and Hoyes Lloyd.

Ottawa, Ontario, to Hull, Quebec, Fairy Lake and return; December 26th; 12.45 p.m. to 4.45 p.m.; wind south-east; average velocity 10 miles per hour; temperature 15 degrees F.; about 5 miles on foot; observers together.

Chickadees 3, Pine Siskin 58, Ruffed Grouse 2, Redpoll 7, Pine Grosbeak 15; Total species 5, individuals 85.

Observers: H. I. Smith, L. D. Burling, and Hoyes Lloyd.

Such lists become of value in proportion to the number of them from all parts of the country and conclusions upon isolated lists must of course be made with caution.

The greatest number of species recorded from Toronto is due to the presence of various waterfowl, some of which may almost always be found on Lake Ontario. The Grebe and the Merganser were seen close under the shore ice, where they seemed to be endeavouring to escape the strong off shore wind and driving snow. The Loons were found just outside the mouth of the Humber River, which was frozen over.

Perhaps the Black-backed Gull should be questioned. However, it appeared large in comparison with the Herring Gulls and the mantle was very dark.

There is no doubt about the Song Sparrow.

They were in their favorite winter haunt, a Cat-tail marsh. On the two other occasions when I have noted these birds at Toronto in winter they were found in the shelter of marsh vegetation.

The Ottawa list has fewer species; consisting strictly of winter birds; although weather conditions made the day much more favourable for observation. The routes traversed at Toronto and Ottawa are comparable; but there was no body of open water at Ottawa.

The flocks of Siskins were the most striking feature. They were feeding upon the abundant crop of cedar seeds. The Pine Grosbeaks and Redpolls were the first noted by me at Ottawa last winter.

HOYES LLOYD.

TEACHING BIRD PROTECTION BY MOTION PICTURES.—The Dominion Parks Branch of the Department of the Interior in co-operation with the Exhibits and Publicity Bureau of the Department of Trade and Commerce and the Biological Division of the Geological Survey, is endeavouring to promote the interests of bird protection in Canada through the medium of the motion pictures.

In films depicting bird life, as in other films, the Canadian element has not been duly represented. Of course films showing Canadian birds on their wintering grounds are of great value, but it is also desirable to balance these, by showing on the screen, pictures which tell Canadians of the wealth and value of the bird life existing to-day in Canada.

To tell a person, not particularly interested, that so many million dollars worth of crops are destroyed by insects, and that birds serve to protect these crops from damage does not impress him as much as to actually show the birds devouring the insects. Similarly, a dry dissertation on the need for distant bird sanctuaries, does not create the interest that a motion picture makes, which clearly shows the wealth of game and other birds protected by that sanctuary.

A beginning was made by showing the Geological Survey film of the "Birds of Bonaventure Island" and "Jack Miner's Geese," at two of the important fall exhibitions. These films are not suitable for general distribution because they lack sufficient explanatory titles, and in consequence, can only be used with lectures.

"A Bird City" which shows the birds on the Dominion sanctuary at Johnson Lake, Saskatchewan, was taken by the Trade and Commerce Department in co-operation with the Dominion Parks Branch and has already been given wide publicity in Canada.

Another film which shows the wonderful results obtained by Mr. and Mrs. J. C. Middleton in the winter feeding of birds at London, Ontario, is completed and others are in contemplation.

There are a multitude of subjects to choose from in planning such pictures, but it is quite possible that the reader of this article knows of good material for Canadian bird pictures which has not been called to the attention of the Branch. If this should be the case valuable bird protection work can be done by acquainting the Dominion Parks Branch of any discoveries made of nesting grounds, feeding stations and the like, so that motion pictures may be taken where possible. HOYES LLOYD.

HUDSONIAN CHICADEE.—Several Hudsonian Chickadees spent last winter with us here in Red Deer, feeding with the common Black-capped ones and making themselves very much at home. I have fed the birds every winter for many years and while numbers of our common Chickadees, Hairy and Downy Woodpeckers and latterly Blue-jays, fed daily on the food provided for them. This is the first time the little Brownies have put in an appearance at our feeding place. A friend reported having seen one near here several years ago. Winter caught us early in October, and my attention was drawn to a new bird note, which on investigation, proved to be the Hudsonian Chickadee, and in a very short time they were feeding with the other birds within a few feet of a window where I observed them at close range. All the birds were tame, the Chickadees absurdly so—and would settle on my hands when putting out food for them. It was rather amusing to watch the Hudsonians “bossing” the Black-caps, the latter having to give way to the strangers at all times. During the very cold weather their only note was a drawling plaintive de-de-de, very unlike our common Black-cap’s clear notes; but with warmer weather and bright sunshine they sing two different songs—one a lovely bubbling note with a canary-like quality to it and the other beyond my powers to describe. Several people came to see these birds, and Mr. F. C. Whitehouse, Dr. Henry George and Mr. C. H. Snell have identified them. We hope they will stay and nest with us. We have a lot of spruce trees here where they could spend most of their time.

Description: Head dark brown, darker on forehead and over eyes; small white spot on cheek; back grey, washed with brown; wings dark grey; tail very dark grey; throat black; breast greyish white; sides cinnamon. One bird, which I presume was an adult male, had the breast pure white and the other colours correspondingly richer.

(MRS.) ELSIE CASSELS, RED DEER, ALTA.

THE STARLING IN CANADA.—We all realize what a mistake it was to introduce the English or House Sparrow into America. However, even the lamentable results of naturalizing this alien was not a sufficiently awful example and the experiment had to be tried with other species. Most such introductions have been failures. The European Gold Finch survived in limited numbers for a while, but quickly died out. The success with other species, such as the Skylark was equally futile, except in the case of the Starling. It has succeeded and multiplied near New York and adjoining coastal localities and like most of such successful introductions we wish it had been otherwise. Whilst not promising to be such an arrant pest as the English Sparrow, its effect has not been good and, flocking to city parks, orchards and such semi-wild places, has still further displaced native species with whom we are in closer sympathy. It has shown all its bad habits and few redeeming good ones.

So far, in Canada, we have congratulated ourselves that our climate would prevent the intrusion of the Starling into our country and while we felt commiseration for our neighbors across the border we took little more than an academic interest in the matter. But it now looks as if our complacency was to be rudely shattered. The Starling has been reported from Canada.

Mrs. R. W. Leonard, of St. Catherines, Ont., writes that she saw a small flock about her place last winter. Further inquiries bring forth the following information from her in substantiation. The birds were observed at a distance of about twenty-five feet through field glasses and were identified by means of comparison with descriptions and plates in Chapman’s *Birds of Eastern North America*, Reed’s *Bird Guide* and the *National Geographic Magazine*. They are described as follows: “Their heads were dark and something like a blackbird’s, the wings were a very dark shade of brown, speckled all over with light spots.” This last detail seems to be conclusive and to quiet any doubts that might otherwise arise as to the identification.

There have not been any published reports of the birds occurrence anything like so far from the place of original introduction and it is surprising that they should have made this great jump in distribution without being reported from intermediate localities. Any other appearance of this species should be immediately reported that we may keep track of its spread and perhaps initiate methods of prevention.

P. A. TAVERNER.

HOW A YOUNG PUPPY AVOIDED STARVATION.—The Clearwater river, which enters the Athabasca at Fort McMurray, Alta., is from its mouth as far as Portage la Loche, a comparatively well-travelled canoe route. Several canoes at least will pass up and down its waters each month of navigation. This portion of the river was formerly an important link in the line of travel between the Churchill and Mackenzie river districts and is still largely travelled. Above Portage la Loche, however, the river is rarely used, the Swan lake Indians being practically the only travellers. These people inhabit the region about Swan lake at the headwaters of the river up in the granite area, and come down once a year to trade at Methye lake.

While on this upper portion of the Clearwater last summer, the writer came across an interesting example of how necessity can change the food habits of the domestic dog. On one of the portages at some little distance from the trail, a whining sound was heard, and on closer investigation a young puppy was discovered apparently not over three months old. In all probability he could not be found when the Indians moved their camp, as dogs in that country are too valuable to be voluntarily abandoned. Pathos was lent to the scene when he was discovered lying on a new Indian grave, which had been excavated laboriously by a wooden pick and shovel. These, as well as a motley array of ancient pails and cans, had been left on the grave, while nearby was a small bottle filled with water hung from a branch to ward off evil spirits. We afterwards learned that the Indians had left for their homes at Swan lake nearly two months before, and in all probability had been absent from the portage at least six weeks. The degree of slumping of the earth on the grave lent corroboration to this estimate. Apparently the puppy had lived on his own resources for that time. Considerable coaxing was required to gain his confidence so that he could be approached, but having done so, we were surprised to find that he was in much better condition than might have been expected. To one accustomed to seeing the gaunt, starving spectres of that country, which hang about the camps, stealing every possible scrap of food, the appearance of this little fellow, in an uninhabited country, only a few weeks old, and whom one would not expect to know how to forage for himself, was quite remarkable. Upon closer investigation, it was found that he had changed his normal diet entirely, and, copying his cousin bruin, had become a berry eater. The country over which the portage passes is a burnt jackpine plain where blueberries and low bush cranberries grow in great profusion.

These fruits the young dog was eating constantly, and he continued to do so, even after we had given him, as we thought, a square meal of rice and meat scraps. Apparently he had become much addicted to his new diet. As he had made such a game struggle for existence, and as the autumn frosts would soon render his food supply precarious, we took him along until we reached the first Indian encampment on our return journey. Although well fed, whenever we landed, he would jump ashore and commence hunting for berries. One wonders why more dogs in that country do not take advantage of this kind of food, but such occurrences seem uncommon.

It may be added that kindness is as effective with the Indian's dog as with the most pampered poodle. The average dog of the north country, kicked, clubbed, and whipped from puppyhood, can scarcely be blamed for occasionally biting even the hand that attempts to pat or feed it. Although with us a very short time, this little dog was very affectionate and, as we paddled away, eluded the hands of the Indians to whom he had been given, jumped into the river and swam after us, and had to be returned forcibly to their keeping.

E. J. WHITTAKER.

Since mentioning the admirable work of Hamilton Laing in the Nature column of the *Toronto Globe*, (Can. Field Nat., xxxiii., p. 99). I have had my attention called to another similar writer in the *Daily Province*, Vancouver, B.C., J. W. Winsor who under the nom-de-plume of "Wild-wood" contributes a series of articles entitled Open-air Jottings. These are a little more purely literary than those mentioned before but breathe a wholesome out-of-doors spirit that is refreshing. They may not contain much information that is new to science but they present commonplace every day activities of wild and semi-wild things in an interesting light and must have a decided influence in educating the eyes of the indifferent to the wonders about them. It is to be regretted that the author does not boldly sign his own name. There is so much nature fakery that it is only due the public to let them know who they are listening to so they may judge authoritatively.

P. A. TAVERNER.

A SPIDER NEW TO CANADA.—At Lake Missanog, Frontenac Co., Ontario, on September 13th, 1919, I collected specimens of *Drapetisca socialis*, a little spider which runs about on the trunks of trees. Mr. J. H. Emerton, who kindly determined the specimens of this species, informs me that these are the first Canadian specimens he has seen.

A. BROOKER KLUGH.





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AMONG THE COFFIN-CARRIERS.

By HARRISON F. LEWIS, BERGERVILLE, P.Q.

Near at hand lay the nest-dotted green slopes of the island, stretches of rank grass alternating with thickets of raspberry and waving alder; farther back were the sparkling blue lake waters, with here and there flocks of great Gulls bedded upon them; and in the distance rose other islands, dark-green lumps, marked with numerous white spots proclaiming their winged inhabitants at home. The picture was most charming, but upon it the eye did not linger, for the centre of attraction was directly overhead, imperiously demanding attention. There, in the bright rays of the June sun, with the soft blue sky as a background, wheeled and circled, a hundred feet above me, a black and white cloud of six hundred Great Black-backed Gulls, the largest, the most magnificent, the most inspiring of our Sea-gulls. There was a scene which could not be duplicated!

Not in Labrador, not in Greenland were these Gulls gathered thus. The lake in which they make their home is bordered in part by farm lands, is within a mile or two of a railway, and within twelve miles of a town of seven thousand people. Although considered one of the wildest of Gulls, the Great Black-backed Gull (*Larus marinus*) or "Coffin-carrier" has established this colony, declared by Dr. C. W. Townsend to be "the largest breeding colony of this bird known, and the most southern one," in the midst of an accessible, agricultural country at Lake George, Yarmouth County, Nova Scotia.

Lake George is situated in the northwestern part of Yarmouth County, in latitude 44° N., longitude 66° 2' W., four miles from the Atlantic shore. It is four miles long and two miles wide, has a very irregular shore-line, and contains about a dozen islands, on seven of which, in the northern part of the lake, the Gulls nest. The greater part of its shore is wooded, but at no place are farm lands far distant, while for two or three miles they border directly upon the beach. The water-supply for the town of Yarmouth, twelve miles distant, is obtained from this lake.

I know of no generally recognized names for the islands occupied by the Gulls, but in order to make my records intelligible I have adopted for my own use names which are here given, together with sufficient information to render the islands identifiable. Big Gull Island is the largest island in the northern part of the lake, and has a larger number of nesting Gulls than has any other island. It is about a quarter of a mile long and half as wide, and rises some forty or fifty feet above the surrounding waters. The greater part of it is covered with alders and wild raspberry bushes, but there are some areas of open grassland, and a few spruce trees. Northern Gull Island lies north of Big Gull Island, to which it is similar, although smaller and with a larger wooded area. Bar Island is a low bar of rocks and gravel, of small extent, without trees or bushes. It lies south of Big Gull Island, and is elevated but one or two feet above the surface of the lake. Garnet Island lies southeast of Big Gull Island, near the eastern shore of the lake. It is small and narrow, and supports two or three living spruces and about a dozen dead ones. On its western side is a rather large area of coarse red sand, made up of small garnets. Catbrier Island, lying south of Garnet Island, is thickly wooded. A small thicket of Catbrier (*Smilax rotundifolia*), which is uncommon in Nova Scotia, grows among its trees. Southern Gull Island is another small wooded island, lying south of Catbrier Island. Round Island is fairly well wooded, and is more nearly circular than are the other islands named. It is near the western side of the lake, at some distance from the remainder of the Gull colony.

My latest visit to this thriving colony was made on June 16, 1920, when I spent about six hours there and landed on each of the islands on which the Gulls nest, and made in each case a short, rough survey, walking over as much of each island as was practicable and noting numbers of nests, eggs, and young birds. As the greater part of the nesting area is covered with a dense growth of

trees, bushes, or ferns, no doubt many nests, probably about one-third of the total number present, escaped my eye. A much larger proportion of the young birds, perhaps four-fifths, must have been passed unseen by me. Not long after hatching, these young Gulls are able to leave the nest, and at the approach of danger, to hide in the abundant cover. The skill with which they do this, and the very large proportion which in consequence are passed unnoticed are well shown by my experience in July, 1914, when banding young Gulls on Big

of which was already banded. In other words, less than 7% of the first lot of young birds could be found in the second search, while more than 95% of the second lot escaped observation at the time of the first search.

In addition to counting exactly the young birds, nests, and eggs seen, I made careful estimates of the number of grown-up Gulls belonging to each island. This was very difficult because, when I visited an island, Gulls from other islands would fly over, in greater or less numbers, to join the



A QUIET DOZE—TWO LAKE GEORGE COFFIN-CARRIERS RESTING ON THEIR NESTING-ISLAND.

Photo by Howard H. Cleaves; reproduced by permission—Cut by courtesy of Dominion Parks Branch.

Gull Island. A careful search of the island at that time revealed but 19 young Gulls, of which I banded 16, all that were large enough for the purpose. I then went to another island, and was there long enough to allow resumption of normal life and a general moving about on the part of the young Gulls on Big Gull Island. Then I returned to Big Gull Island and searched it a second time, finding 21 young Gulls large enough for banding, but one

actual residents of the island in protest. Nevertheless, I made repeated, careful estimates, with all the known conditions in view, and with the exercise of the strongest conservatism. A few Herring Gulls (*Larus argentatus*) are included in the colony, but they are almost lost in the clouds of Black-backs, in comparison with whose grandeur they, splendid birds though they are, seem small and very ordinary.

The results of my survey are shown in the accompanying table. The figures in the three columns at the right are estimates; all the other

figures in the table are the results of actual counts. The term "adult" in this table refers to all birds hatched prior to 1920.

Island	Empty Nests	Nests with 1 egg	Nests with 2 eggs	Nests with 3 eggs	Total Nests	Total Eggs	Young	Dead Young	Dead Adults	Adult Herring Gulls (Estim.)	Adult G. B. b. Gulls (Estim.)	Total Adults (Estim.)
Round -----	5	1	—	—	6	1	4	—	—	15	—	15
So. Gull -----	5	3	2	—	10	7	18	—	—	—	25	25
Catbrier -----	1	—	—	—	1	—	2	—	—	10	—	10
Garnet -----	11	8	3	1	23	17	21	—	—	—	50	50
Bar -----	4	1	2	2	9	11	1	—	—	—	25	25
Big Gull -----	124	32	14	9	179	87	155	6	2	10	590	600
No. Gull -----	80	24	5	4	113	46	52	3	1	—	225	225
Total -----	230	69	26	16	341	169	253	9	3	35	915	950

A conservative estimate would, I believe, place the total number of grown-up birds in the colony in 1920 at not less than 1,250, made up of about 1,200 Great Black-backed Gulls and 50 Herring Gulls. These figures may be arrived at in either of two ways.

The total number of nests seen is 341; if this was two-thirds of the total number present, the colony contained 511 nests, which would mean 1,022 breeding birds. That there were enough non-breeding grown-up Gulls in the colony to bring the total up to 1,250 is not improbable.

Again, the number of grown-up birds seen at the colony by me was most conservatively estimated, as shown by the tabulated figures, at 915 Great Black-backed Gulls and 35 Herring Gulls. To suppose that at least 285 of the former species and 15 of the latter were away from the colony, hunting for food, at the time of my visit seems very reasonable. Not only were Gulls to be seen flying to the lake at 9.00 a.m., when I approached it, and at 6.00 p.m., when I finally left its vicinity, but Great Black-backed Gulls, presumably from this colony, may be found daily in summer at practically every point along the seacoast for sixty miles in either direction.

These estimates are the best which I have been able to prepare, but, if any one considers them in error in any way, the actual counts and facts stated above may, of course, form a basis for any estimate preferred.

When one approaches an island in the colony, the Gulls able to fly gradually leave it and, for the most part, circle overhead, although some alight on the water not far away. The air becomes filled with a pandemonium of deep cries, of which I was

able to distinguish three kinds, a moderately loud *cuh-cuh-cuh*, *cuh-cuh-cuh*, a loud, bass *Om, Om*, and a roaring *rrr-rrr-rrr-rrr*. Most of the flying birds are in fully adult plumage, but some of them show traces of immaturity in brown markings here and there. By the time one lands on an island, all the Gulls able to fly have left it, and none of them return until the intruder has departed. As I walked over Big Gull Island, with fully six hundred Great Black-backed Gulls circling above me, I could not help thinking how little their fear was justified by the actual location of the power to harm. If those hundreds of tremendous birds had but realized their strength and willed to use it in effective coordination against the weaponless, shelterless human being intruding among their homes, they could with the greatest ease and speed have laid my bare skeleton to bleach upon the grass. But Great Black-backed Gulls are useful scavengers, naturally wild and shy, and I could not see that any of them at any time showed even especial solicitude for the particular nests or young near which I might be.

At the time of my visit, June 16, most of the young were recently hatched, but others were in the act of hatching. The newly-hatched young of the Great Black-backed Gull is a wet, spine-covered, ugly-looking dark object, sprawling helplessly, and uttering repeatedly a short, shrill whine. Soon, however, its spines burst into gray and black down, it gains the ability to walk and run about, and its cry changes to a rattling *ch-ch-ch*. The majority of the young which I saw on June 16 were in the downy stage. A small number showed feathers of the juvenal plumage in the wings and at the sides of the breast, and a very few of the

largest also had feathers of this plumage all across the breast and in the tail. Most of the young which are old enough to do so hide among ferns, bushes, grass, or rocks when the old birds leave an island at the approach of an intruder, but a few enter the water and swim rapidly away for a little distance. They are good swimmers, but can be overtaken easily by a rowboat. Those which hide usually remain quiet until they believe they are discovered, when they try to run, but they are slow and clumsy runners.

Gulls were the Black Duck (*Anas rubripes*), Spotted Sandpiper (*Actitis macularia*), Ruby-throated Hummingbird (*Archilochus colubris*), Purple Finch (*Carpodacus purpureus purpureus*), Song Sparrow (*Melospiza melodia melodia*), Yellow Warbler (*Dendroica aestiva aestiva*), and Maryland Yellow-throat (*Geothlypis trichas trichas*).

The colony of Gulls was first shown to me in June, 1912, by Mr. E. C. Allen, now of Halifax, N.S., who has given a brief account of it in his "Annotated List of Birds of Yarmouth and Vi-



THE CHALLENGE—A GREAT BLACK-BACKED GULL CALLING AT LAKE GEORGE.

Photo by Howard H. Cleaves; reproduced by permission—Cut by courtesy of Dominion Parks Branch.

On the gentle slopes of the islands the nests are mere hollows in the earth, generally with some lining of sticks and dead grass or *Usnea* lichen. Nests which are placed on piles of large boulders are much more substantial, as the character of the site necessitates, and are solidly built of grass, sticks, and rubbish. In some cases I noticed that the grass was still green. In one instance only did I find a nest lined with down, and, as that was on Round Island, it was probably a Herring Gull's nest.

Other birds observed on the islands used by the

cinity, Southwestern Nova Scotia" (Trans. N.S. Inst. of Sci., Vol. XIV, Part 1, pp. 67-95, Jan. 5, 1916). A month later I again visited it, this time in company with Mr. Howard H. Cleaves, now of Albany, N.Y., who then made some splendid photographs of the gulls in their home, some of which were published in the 'National Geographic Magazine' for June, 1914, and some of which, by his kind permission, appear herewith. I visited the colony in July, 1913, and July, 1914, also. In those years there were not more than two-thirds

as many Gulls in the colony as I found there in 1920, so that it is evident that the colony is making encouraging growth.

It is earnestly hoped that, through the powers conferred by the Migratory Birds Convention Act, this colony of Gulls may be made a permanent reservation, and that the friends of bird protection in Canada may do everything possible to assist in bringing this about. Although all Gulls are protected by the Act, yet the general protection thus afforded must often, from force of circumstances, be insufficient, and to make this splendid colony a

jury to the colony becomes greater each year, and special protection should be given before any such harm, of which we have had too many sad examples elsewhere, is actually committed. No chances should be taken with such a colony as this, the largest and the most southern and accessible colony in the world of the greatest and grandest of our Gulls. The islands used by the Gulls are small, with small timber of negligible value, and are quite valueless for other purposes, for neither man nor domesticated animals can be allowed to live on them, because the waters surrounding them



PUSHING OFF—A GREAT BLACK-BACKED GULL IN THE ACT OF TAKING FLIGHT.

Photo by Howard H. Cleaves; reproduced by permission—Cut by courtesy of Dominion Parks Branch.

reservation, with a local warden during the breeding season, would add greatly to its chances of survival and growth. At present, although the wardens in the Maritime Provinces are alive to the situation and are doing their best, these Gulls must depend for protection largely on lack of widespread knowledge of their breeding at this place and on poor boating facilities on Lake George. As the country about the lake becomes more thickly settled, the chance of sudden irreparable in-

jury to the colony becomes greater each year, and special protection should be given before any such harm, of which we have had too many sad examples elsewhere, is actually committed. No chances should be taken with such a colony as this, the largest and the most southern and accessible colony in the world of the greatest and grandest of our Gulls. The islands used by the Gulls are small, with small timber of negligible value, and are quite valueless for other purposes, for neither man nor domesticated animals can be allowed to live on them, because the waters surrounding them

are a source of water-supply for Yarmouth town. On the other hand, such an eminent authority as C. W. Townsend, M.D., has stated to me that "the presence of these Gulls would have no effect on the potability of the water, or perhaps a beneficial one, as they would at once remove all dead fish or other animal matter that might otherwise pollute the lake." Although such a large number of Gulls must obtain the greater part of their food supply elsewhere than at the lake, yet they do not

neglect the lake, as some birds might do, but may be seen searching for food even in parts of it remote from their nesting-islands. There seems, therefore, to be every reason for taking action to

ensure the preservation at one and the same time of a unique and splendid bit of wild life and of a tireless band of scavengers and guardians of the health of a large town.

THE SPIDERS OF CANADA.

BY J. H. EMERTON.

The writer recently published, in the *Transactions of the Canadian Institute*, Toronto, a catalogue of the known spiders of Canada, numbering 342 species. This seems small when compared with the numbers in countries where the fauna is better known, but spiders are hard to find and this number represents very well the larger and more common species. Many more will do no doubt be found, as more persons take up the study of these animals.

In 1846, John Blackwall, then the leading student of spiders in England, published in the *Annals and Magazine of Natural History* of London a "Notice of Spiders captured by Prof. Potter in Canada" a few years before in the neighborhood of Toronto. In 1871, he published in the same journal a "Notice of Spiders captured by Miss Hunter in Montreal." In 1875, T. Thorell published in the *Proceedings of the Boston Society of Natural History* "Descriptions of Spiders collected by A. S. Packard in Labrador." In 1876, the writer spent a short time in Montreal and collected a few spiders, which were described in a paper on New England *Therididae*, published by the Connecticut Academy in 1882. Between 1880 and 1890, J. B. Tyrrell collected spiders at Ottawa, in the Rocky Mountains and other parts of Canada, and at the same time T. E. Bean, in connection with his work on Lepidoptera, collected spiders around Laggan in the Rocky Mountains.

Since 1900, a considerable number of collectors have interested themselves in Canadian spiders. In 1905, the writer visited western Canada collecting at Vancouver, Lake Louise, Banff and Medicine Hat. The same year G. W. Peckham collected through the same region, especially at Vancouver, Glacier and Banff. In 1914, the writer again visited the Rocky Mountains, and collected in the Yoho Valley and Lake Louise, Banff and Jasper Park, and also at Edmonton, Athabasca Landing and Prince Albert. In 1915, he collected in the lower St. Lawrence Valley, and in 1917 at Le Pas and along the Hudson Bay Railway. The Canadian Arctic Expedition of 1913 to 1916 made a small collection of spiders on the Arctic coast of Canada and Alaska. The Crocker Land ex-

pedition also collected spiders on the west coast of Greenland in 1917. Messrs. E. M. Walker and T. B. Kurata of Toronto, collected spiders in 1913 at several points across Canada, and especially on Vancouver Island. Mr. N. B. Sanson of Banff, has collected spiders for several years in the surrounding country, especially on Sulphur Mountain. Mr. M. Taylor of Vancouver, has collected around that city and in the mountains north of it. Mr. Robert Matheson collected in Nova Scotia in 1913. Dr. C. W. Townsend of Boston, on his visit to "Audubon's Labrador" in 1915, collected spiders and extended the known range of several species. Spiders have also been collected in recent years by Mr. Norman Criddle in Manitoba, Mrs. J. H. Faull in Toronto, Mr. Charles Macnamara of Arnprior, Ontario; Mr. F. W. Waugh of Ottawa, Mrs. W. W. Hippiusley of Dauphin, Manitoba; Prof. A. B. Klugh of Kingston, Ontario; the late C. G. Hewitt, Mr. Arthur Gibson, and other correspondents of the Entomological Branch of the Department of Agriculture at Ottawa. New discoveries have been noted from year to year in the Entomological Record published annually in the reports of the Entomological Society of Ontario.

The spiders which Blackwall described cannot now be found and apparently no care was taken to preserve them after descriptions were published. The spiders collected by Packard in Labrador have also been lost, and some of their descriptions will never be certainly identified. The spiders collected by Tyrrell and his colleagues are in the collection of the Entomological Branch at Ottawa or in that of Harvard University. The collection at Ottawa has been much increased in the last few years and now contains probably 300 of the species catalogued. The Harvard collection is rich in Canadian spiders and contains most of the

The common spiders of Canada are described and illustrated in "Common Spiders of the United States," by J. H. Emerton, published in 1902, by Ginn & Co., Boston; "The Spider Book," by J. H. Comstock, published in 1912, by Doubleday, Page & Co. and "American Spiders and Their Spinning Work," by H. C. McCook, published by the author in Philadelphia, 1889 to 1893.

author's types and those described by Banks and Peckham. At Toronto there is a small collection with a large proportion of west coast species. The museum at Banff contains large numbers of the spiders living in the neighboring mountains.

The spiders of Canada fall naturally into several faunal groups. The house spiders with which we are most familiar are most of them introduced from Europe or from more southern parts of this continent. The common *Tegenaria derhami* of cellars and barns is a European species. The common round web spider of barns and bridges, *Epeira sericata* is also European, and is never found far from buildings. The still more common spider in houses of all kinds, *Theridion tepidariorum*, is found in caves and under cliffs farther south, but its original home is unknown. The same is true of the large gray *Epeira cavatica* found in barns and sheds through southern Ontario, Maine, and New Brunswick. The European *Epeira diademata*, a spider of gardens and the outside of houses, has been found at St. Johns, Newfoundland, and at Quebec.

The most distinct faunal group in Canada is the so-called Canadian fauna which occupies the part of Canada originally covered by forest consisting mostly of spruce. This comes to the coast in Maine and New Brunswick, and its southern border extends westward across Maine and Ontario north of the Great Lakes and the prairies to the Rocky Mountains. Several spiders have their southern limits along this border, as the author has shown in the report of the Entomological Society of Ontario for 1917. *Theridion zelotypum* is the most conspicuous of these, making large coarse webs between the spruce branches, with nests in which the female and her brood of young live together through the summer. *Linyphia limitanea* follows much the same range but a little farther north from Newfoundland to Manitoba, and has not been found beyond the Canadian boundary except in northern Maine. *Zilla montana* is another Canadian species that extends across the continent and south on mountain-tops to North Carolina. It lives in trees and on rocks, and settles readily on houses surrounded by forest. It lives also in Europe in the Alps. *Linyphia nearctica*, another species of this group, seems to be very sensitive to its surroundings. It is found usually on spruce trees near bogs from Labrador to the Rocky Mountains, and extends south in the upper forest of the mountains of New England and New York from an altitude of 2,500 feet up to the limit of trees. All these spiders live in trees well above the ground, but other species that live in moss close to the ground have similar distribution. One of these is *Theri-*

dion sexpunctatum, a pale spider with gray and white spots, and another, *Pedanastethus fusca*, a darker gray species resembling *P. riparius* of farther south. All the spiders of the Canadian fauna do not have this restricted range but extend much farther north and south. The species of *Pardosa* which live in open ground in bogs, along river banks and on mountain-tops, extend northward, some of them as far as animals of any kind have been found and also extend southward in bogs to the New England coast, New York and Ohio and on mountain-tops to Colorado. Some of the widely distributed Canadian species extend eastward by way of Greenland and Iceland, into Europe, or westward through Alaska into Siberia.

South of the spruce forest area, the country is occupied mainly by a fauna known as "transition" or "Alleghanian," containing many species of very wide distribution and closely related to the fauna of northern Europe. Through southern Ontario, Manitoba and Saskatchewan, the common spiders belong to this group. One of the most common and conspicuous by its cobwebs is *Agalena naevia*, which makes its large flat webs in grass fields, among low bushes, in dead trees and brush, and even in windows and doorways. These spiders lay their eggs late in the summer in flat cocoons partly covered with leaves and dirt, and adults all die before winter. The young hatch and sometimes leave the cocoon before cold weather, but for the most part wait until the next spring. The large *Epeira marmorea* and *Epeira trifolium* are conspicuous species, and also mature in the late summer and die before winter. In August and September their large round webs hang in large numbers in berry bushes and golden-rod, the brightly colored spiders hidden nearby in a nest of leaves fastened together and lined with silk. *Epeira patagiata* is another common spider of this fauna and extends far north into the Canadian area. It is colored in grays and browns like bark and wood. It makes its cobwebs after dark and leaves them at daylight, hiding in some sheltered place often several feet away. It establishes itself readily in barns and on the outside of houses, porches and fences, both in America and in Europe. The large white flower spider, *Misumena vatia*, lives among flowers all the way across Canada, eating flies and other insects that come to rest and feed on the flowers. Into this part of the fauna come many species of jumping spiders, *Attidae*, *Dendryphantes militaris* and *Dendryphantes flavipedes* live in great numbers on small trees and bushes, making no cobwebs but moving about constantly among the leaves, creeping close to resting insects and jumping upon them. They

are covered with hairs and scales, often brightly colored and iridescent, especially in the males. The common *Saliciscus scenicus* of both Europe and America lives on the outside of houses and is covered with a mixture of white, gray and yellow scales which give it the color of unpainted wood. It hunts and eats gnats and small insects of any kind. On the ground live several common *Lycosidae*, long-legged running spiders; in the woods, *Lycosa pratensis* and *Lycosa frondicola*, and in the open fields, several species of *Pardosa*. In midsummer the *Lycosidae* carry around their young enclosed in round cocoons attached behind to the spinnerets.

In the southern part of Canada come in a few spiders related to the more southern Carolinian fauna. The most conspicuous of these are the two species of *Argiope*, large spiders brightly marked with black, yellow, and silvery white. They make large, round webs in tall grass and low bushes, especially in low ground near brooks and ditches. Unlike the large *Epeira*, they hang in their webs through the day and so are more generally known. *Argiope aurantia* has been found at Toronto and *Argiope trifasciata* at Ottawa and Montreal. The large burrowing *Lycosa* which are so abundant in southern Manitoba belong to species that range southward as far as Texas. The habits of these burrowing spiders have been described by Mr. Criddle in the *Ottawa Naturalist* of April, 1918.

In the western part of Canada, a Pacific coast fauna extends north from California as far as Alaska, some of its species as far as the Klondike valley and eastward beyond the Rocky Mountains. *Brachybothrium pacificum*, the only Canadian representative of the tropical family *Aricularidae* occurs on Vancouver Island. *Epeira gemma* and *Linyphia litigiosa*, common in California, come north into British Columbia and eastward as far

as Medicine Hat. In British Columbia, *Agalena pacific* partly replaces the eastern *Agalena naevia* and *Amaurobius pictus* replaces *Amaurobius beneti*. As yet, however, little is known about the spiders of western Canada and the Rocky Mountains.

North of the coniferous forest of Canada is a country little explored. Its spiders are known only from explorations of Labrador and the Arctic coast. Some of the most abundant species are the same which live in bogs and open spaces through the forest area and even south of it. The most widely distributed of these is *Pardosa glacialis*, which is abundant as far north as Greenland and Banks Land, and south into the United States. Hardly less diffused is *Pardosa greenlandica*, which extends along the coast as far south as Maine, is found at various points across Canada, and is abundant on all the mountains east and west above the trees. *Lycosa albohastata*, a small species brightly marked with black, white and orange, is found running on the sed just above the trees in the mountains of New Hampshire, in the Rocky Mountains, on the coast of Maine and Labrador, and along the Hudson Bay railway, so that it probably extends entirely across Canada near the northern limit of trees. Another arctic species is the variable and handsomely marked *Lycosa pictilis* that lives on the top of Mount Washington, on the coast of Labrador and Greenland and Alaska, and is probably identical with species described from arctic land farther north. *Erigone psychrophila* and other small species living among low plants near the ground are found at various points along the arctic coast from 60° to 80° north. As far as spiders are concerned, no faunal group corresponding to the "Hudsonian" of bird students has been noticed, but may be defined by a more thorough study of the northern border of the coniferous forest.



NOTES ON THE FAUNA AND FLORA OF EAST AND MIDDLE SISTER AND NORTH HARBOR ISLANDS, LAKE ERIE.

By E. W. CALVERT, ARNER, ONT.

The following observations were made during a two days' trip to the islands, which are situated a few miles west of Pelee island in western Lake Erie. All have rocky shores with much shingle or coarse gravel and have a number of bays and shoals. Owing to a severe gale most of the time was spent on North Harbor island which contains but slightly over an acre in its area. The island is narrow and a ridge follows the centre. The following trees were found, being arranged in order of their abundance:—White Elm, Hackberry, Kentucky Coffee Tree, Sugar Maple, Chokecherry, Cottonwood, Staghorn Sumach and a shrubby willow. Along shore were observed several large stumps of the Red Cedar no doubt flourishing many years ago. Of the shrubs and vines the common elder (*Sambucus Canadensis*) is represented and Virginia Creeper, Climbing Bittersweet (*Celastrus*), Wild Grape and Poison Ivy abound. No attempt has been made to tabulate the herbaceous plants as a number were not familiar to the writer.

The item of greatest biological interest however is a large colony of the Common Tern (*Sterna hirundo*) the estimated number of birds being 2,000 to 2,500. Some 800 occupied nests were counted over half of which contained three eggs, about one quarter containing two, a few with four and the remainder with one. The nests were situated on the shingle a few feet above the water. Some were somewhat concealed by foliage and driftwood, others were in plain view but blended rather well with the shingle, thus making it necessary to pick one's steps. Most of the nests were composed of broken reeds and bits of driftwood but in some green leaves were employed, while in still others there was merely a hollow in the shingle; these were exceptional however. The nests were often as close as two feet to one another and were most numerous in the troughs of shingle formed by the action of the waves. The ground color of the eggs is a pale greenish or yellowish buff with variable dark spots sometimes forming a ring at the larger end. The eggs vary greatly in color, even in the same nest very light and very dark examples being frequent. During our whole stay the birds kept up an incessant noise and seemed to treat our presence with great disapproval. While at this island only one bird had hatched this being found just previous to our departure on the 21st of June.

The bird population of the island other than tern was scant consisting of a Red-eyed Vireo and

a Song sparrow, a visiting (?) pair of Kingbirds, as well as several Bronzed Grackles and a Crow, present no doubt for nest robbing as the terns made a great noise during their presence. Several Herring Gulls and a Bank Swallow were also noted flying past.

The next island visited was East Sister and contains thirty or more acres, about ten of which is cleared and is planted to peach trees and garden crops chiefly. As might be surmised, owing to its much larger size all branches of the fauna and flora were represented by a larger number of species than was the island previously visited. In addition to the trees enumerated as found on North Harbor the following were found on East Sister:—Basswood, Shellbark Hickory, White Ash, Silver Maple, Aspen, Sycamore, Red Elm and a species of Dogwood. The most abundant bird on this island was the Bronzed Grackle but the House sparrow, Kingbird and Red-winged Blackbird were also well represented. The following were also noted in small numbers:—Crow, Red-eyed Vireo, Wood Pewee, Cedar Waxwing, Cowbird, Robin, Killdeer and Turkey Vulture. According to report the Cottontail is found here but no other mammal is known, but no doubt others occur.

The last island visited is somewhat isolated, being about ten miles from the others and about twelve from the mainland. It contains some eleven acres, all of which are densely wooded, and has high rocky banks. On the side facing east is a promontory of rock and on the opposite side great windrows of gravel where Common Terns nest in great numbers. The tern population of this island was estimated at some 8,000 and the occupied nests at 1,500 to 2,000. Apparently over half of these had been robbed earlier in the season as the unoccupied nests were quite as numerous as the occupied ones. On the day the island was visited (June 22nd) about twenty per cent. of the birds were hatched but probably these did not start to hatch before the 20th.

The trees found on this island were almost identical in species to those found on North Harbor, the Red Cedar being alive in this case and the Sumach absent. Other than the terns, the following birds were noted:—Indigo Bunting, Kingbird, Red-eyed Vireo, Carolina Wren and a flock of about 500 Herring Gulls which left the bar on our approach. A visit to the island on May 30 revealed the pres-

ence of a hatching Black Duck, the eggs of which had probably been laid for about three weeks. Down from the bird's breast was used to line the finely-constructed nest.

To those interested in the nesting of the Common Tern, I would refer them to an article in *Bird-Lore* for August, 1904, where the colonies on the Hen

and Chicken group of islands were studied, and to the *Wilson Bulletin* for March, 1916, where a colony off the coast of Massachusetts was studied. Photographs are supplied in both articles and it is interesting to note that in the ocean colony the nesting material is totally different from and more abundant than that employed in Lake Erie.

OBITUARY

JOHN MACOUN, 1831-1920.

ASSISTANT DIRECTOR AND NATURALIST TO THE GEOLOGICAL SURVEY OF CANADA.

Prof. John Macoun, one of the oldest members of the Ottawa Field-Naturalists' Club, died at Sidney, Vancouver Island, B.C., on July 18, 1920, in his 90th year. He was born at Maralin, Ireland, about twenty miles from Belfast, on April 17, 1831. Like many other families in Ireland, after the great depression through famine and rebellion between 1840 and 1850, his family emigrated to Canada in the latter year, and settled in Seymour Township, Northumberland County, Ontario. At that time much of this part of Ontario was heavily wooded, and John Macoun and his brothers, Frederick and James, with their mother, began to clear a farm. Profits were slow in coming, and in order to relieve the situation, John, who felt that his calling was in a different field, began to teach school, as many another bright young man has done in Canada. Teachers were much needed in the country, and soon he had charge of a small rural school. He felt, however, that to succeed as he desired, more knowledge was necessary, so he took a course in the Normal School in Toronto in 1859. Later he was in charge of one of the smaller schools in Belleville, then became head of the public schools there.

All this time his love of nature had led him to study her many forms, but in botany he took particular delight, and by 1874 he had made such a name for himself in this study, that he was appointed Professor of Botany and Geology in Albert College, Belleville, a position he filled with great ability and success until 1881, when, having been appointed Botanist to the Dominion Government, he severed his connection with the college to devote all his time to public service, although since 1872 he had been employed part of the time by the Dominion Government.

In 1872, Mr. Macoun was invited by the late Sir Sanford Fleming to be the botanist of a party on a expedition through the West to explore and to determine the line for the first transcontinental rail-

way, now known as the Canadian Pacific. Associated with the party was the late Principal Grant of Queen's University, who in his book "Ocean to Ocean" gave a description of the trip and the part John Macoun played in it.

In 1875, Mr. Macoun was appointed botanist to an expedition under the leadership of the late Dr. Alfred Selwyn, then Director of the Geological Survey, and assisted in exploring the Peace River and the Rocky Mountains; and in 1877 he was asked to write a report on the country he had visited, and it was this report which brought Mr. Macoun prominently before the public, for in it he was most enthusiastic over the possibilities of the West, claiming that there were immense areas suitable for wheat culture, and for settlement.

He again explored the prairies in 1879, 1880 and 1881, and in 1882 published his very valuable work "Manitoba and the Great North-West," an octavo volume of 687 pages, and still the most complete book on the West which has been published. This was a private enterprise, but the information contained in that book did much to open the eyes of Canadians and the people of other countries to the vast possibilities of the Canadian North-West. On page 213 he wrote: "Much might be written about the future, and calculations made regarding the wheat production of years to come, but such speculations are needless. In a very few years the crop will be limited by the means of export, and just as the carrying capacity of the roads increase, so will the crop."

In 1877, he was invited to write a report on the whole of the western country for the information of the Minister of Public Works in connection with the new railway, and was cautioned not to draw on his imagination. "In response to this I wrote as much truth about the country as I dared," he states in another part of his book, "for I saw that even yet my best friends believed me rather wild on

the 'illimitable possibilities' of the country. When summing up the various areas I reached the enormous figures 200,000,000 acres. I recoiled from their publication on the ground that their very immensity would deny me that amount of credence I desired, so as a salve to my conscience I kept to the large number of 200,000,000 acres, but said that there were 79,920,000 acres of arable land and 100,000,000 acres of pastures, swamps and lakes. My statements were looked upon as those of an honest, but crack-brained enthusiast and little at-

tention was paid to them." The sequel, however, has shown that he was a true prophet.

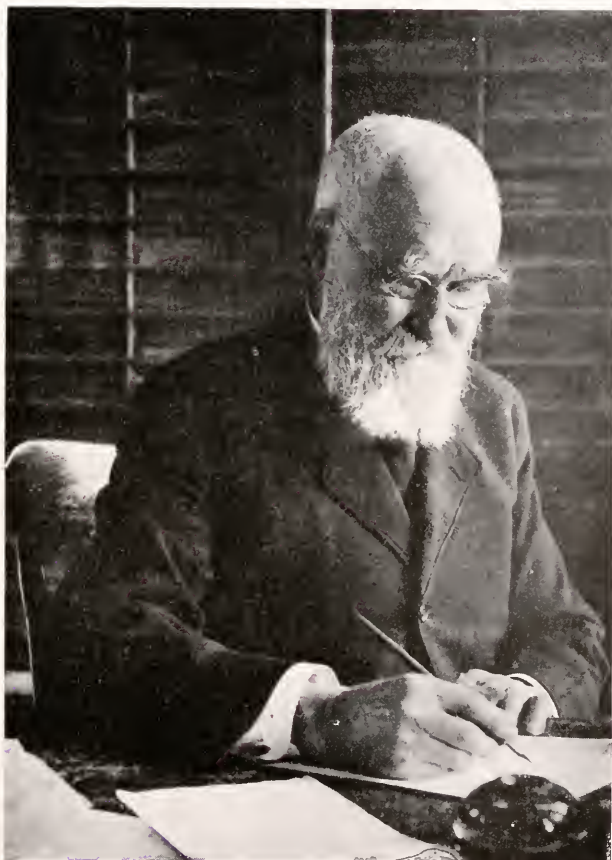
cultural Committee to give a description of the country, and after his address the following resolution was passed:

House of Commons,

Ottawa, 23rd Jan., 1906.

"Moved by Mr. Derbyshire,
Seconded by Mr. Wright, (Renfrew)

"That the thanks of this Committee be now tendered to Mr. John Macoun, Naturalist to the Geological Survey Department of Canada,



PROF. JOHN MACOUN.

for the valuable information laid by him before the Committee, on the natural capabilities of that large section of Western Canada extending from Edmonton to Portage la Prairie, on the occasion of his appearance before us, on this subject.

"The Committee desire also to record their appreciation of the valuable services Mr. Macoun has rendered to Canada in the past thirty years of his arduous official services as a



practical science officer of the Geological Survey of the Dominion; notably, are the following explorations of territory:—

"Prof. Macoun's first trip across the prairies was with Sir Sanford Fleming, in 1872. His glowing report of the country traversed caused him to be sent again in 1875, to explore the route that it was then intended that the Canadian Pacific would follow. When the present route was decided upon the Government sent him in 1879, 1880 and 1881 to report upon the country that would be opened up by the railway. Optimistic as his reports and prophecies were, they have all proved true. To these are to be added, Prof. Macoun's explorations in the Canadian Yukon Territory, in 1903, which revealed for the first time, that that far northern division of Canada also possesses agricultural resources of no mean order."

"Motion cordially adopted by Committee, and presented to Prof. Macoun, pro forma, by the Chair."

The Ottawa Field-Naturalists' Club was organized on March 19, 1879, and John Macoun, who at that time lived in Belleville, became that same year one of the corresponding members, and on March 11, 1881, came to Ottawa and delivered an address before the Club on "Capabilities of the Prairie Lands of the Great North-West as Shown by Their Fauna and Flora." He asserted that the botanical test was the only true criterion by which the agricultural status of any district should be judged. In the North-West every species of plant was found to have its particular habit as regards soil and moisture. He had found that even as far north as the Peace River a large number of plants occurred which were of the same general biological type as many Ontario plants, hence he concluded that about the same summer climatic conditions prevailed. He found that certain grasses ripened in the same number of days as wheat in Ontario and the same grasses ripened in about the same time in the North-West, hence the growing seasons were sufficiently alike to ensure the cultivation of wheat over a vast area.

Prof. Macoun moved to Ottawa from Belleville with his wife and family in the autumn of 1882, and lived continuously there until 1912, when he moved to British Columbia. He was President of the Ottawa Field-Naturalists' Club in 1886-7. He was promoted to the position of Assistant Director and Naturalist of the Geological Survey in 1887, which he held until his death. While his home was in Ottawa, he was exploring and collecting in some part of Canada nearly every summer.

It was during these thirty years that he, with the assistance of his son, James M. Macoun, built

up the greater part of the herbarium of over 100,000 specimens of Canadian plants, now in the Victoria Memorial Museum, Ottawa, although in the herbarium are many specimens which he collected sixty years ago. He made large collections also in Western Canada between 1872 and 1882. The first part of his "Catalogue of Canadian Plants" was published in 1883, and he continued to publish parts of this list until 1902, when the last number was issued. The parts appeared as follows:—Polypetalae, 1883; Gamopetalae, 1884; Apetalae, 1886; Endogens, 1888; Acrogens, 1890, Musci, 1892; Lichenes and Hepaticae, 1902. The publication of this catalogue was a great undertaking, brought to a successful completion after years of close and personal work. There was a great demand for it, and it is now out of print.

Prof. Macoun began collecting bird skins for the Museum of the Geological Survey at Ottawa in 1879, and through his efforts a large number of skins were obtained from that time on, and before he left Ottawa he had the satisfaction of seeing a very fine collection of Canadian birds there mainly as the result of this work.

He published a Catalogue of Canadian Birds in three parts, the first in 1900, containing the Water Birds, Gallinaceous Birds and Pigeons; the second in 1903, of the Birds of Prey, Woodpeckers, Fly-Catchers, Crows, Jays, and Blackbirds; the third in 1904, of the Sparrows, Swallows, Vireos, Warblers, Wrens, Titmice and Thrushes. These proved very popular and useful, and it became necessary to re-publish them in one volume, which was done in 1909 with the assistance of his son, James M. Macoun. This Catalogue gives the name, range, and breeding habits of Canadian Birds.

He published many years ago a small text book on "Elementary Botany," and from time to time during his long life issued many valuable reports and lists.

He had in an advanced stage of preparation, before his death, an "Annotated List of the Flora of the Ottawa Region, an "Annotated List of the Flora of Nova Scotia," and an "Annotated List of the Flora of Vancouver Island."

He was interested in and loved all branches of natural history, and may be said to have been an all round naturalist, though it was as a botanist he was most known. He was one of the first Canadian Fellows of the Linnaean Society of London, Eng., and was a charter member of the Royal Society of Canada.

The town of Macoun, Sask., was named after him.

Prof. Macoun was a man of very strong vitality and was seldom ill. He had decided that he would spend his last years on Vancouver Island, where in

that mild climate he could be in the open air and collect specimens for most of the year, and had fixed on the spring of 1912 as the time when he would move to British Columbia. No doubt the rush and excitement of closing up his work at Ottawa had something to do with the paralysis which struck him down a few weeks before his intended departure. But, while the attack was a severe one, none of his faculties were affected, and though a few weeks later than the date he had decided upon, he left for British Columbia in April, 1912, with his right arm and right leg somewhat affected by his illness. His health continued to improve, and he was soon roaming the woods of Vancouver Island making collections. He had been collecting mosses since 1861, and when he had found and catalogued practically all the flowering plants in Canada, he devoted much time to the study of mosses, lichens, liverworts and fungi, and when he went to live on Vancouver Island his time was devoted mainly to cryptogams, and he gathered many specimens there.

The Government is often blamed for not showing appreciation of services rendered by members of the Civil Service, but in the case of Prof. Macoun this was not so. When at 81 years of age he decided to leave Ottawa in 1912, and spend the rest of his days in British Columbia, he knew that he might be superannuated as he was past the age limit and still on full salary, but the Government, considering his past record, treated him generously, and he received a copy of the following order-in-council, by which he retained his position in the Service until his death,—

“Privy Council, Canada,

9th June, 1913.

“The Committee of the Privy Council, on the recommendation of the Minister of Mines, advise that Prof. John Macoun, Naturalist and Botanist in the Geological Survey, who is over the prescribed age limit referred to in Rule 40 of the Treasury Board Minute, dated 11th November, 1870, be, in recognition of the worth of his past work, allowed to retain until further notice, his connection with the Department of Mines, outside of Ottawa; his living expenses while engaged on actual field duty only to be a charge against the Geological Survey appropriations.”

Rodolph L. Boudreau,

Clerk of the Privy Council.

The Honourable

The Minister of Mines.”

SPECIES NAMED AFTER JOHN MACOUN

Perhaps no better tribute to the work of John Macoun can be paid than the list of some of the

species of plants, etc., which have been named after him, most of which were discovered and collected by him but named by some other scientist. While there are 45 species in this list, it is not a complete one, but it indicates the large number of new and rare specimens collected by him. Few scientists have had as many species named in honour of them as John Macoun.

FLOWERING PLANTS.

Alopecurus Macounii, Vasey.
Calamagrostis Macouniana, Vasey.
Elymus Macounii, Vasey.
Ranunculus Macounii, Britton.
Lesquerella Macounii, Greene.
Draba Macouniana, Rydberg.
Arabis Macounii, S. Wats.
Potentilla Macounii, Rydberg.
Rosa Macounii, Greene.
Lupinus Macounii, Rydberg.
Astragalus Macounii, Rydberg.
Gentiana Macounii, Holm.
Oreocarya Macounii, Rydberg.
Antennaria Macounii, Greene.
Hymenoxys Macounii, Rydberg.
Arnica Macounii, Greene.
Bidens Macounii, Greene.
Sisyrinchium Macounii, Bickn.

MOSSES.

Andreaea Macounii, Kindb.
Distichium Macounii, C.M. & Kindb.
Encalypta Macounii, Aust.
Entodon Macounii, C.M. & Kindb.
Homalia Macounii, C.M. & Kindb.
Hypnum Macounii, Kindb.
Philonotis Macounii, Lesq. & James.
Pogonatum Macounii, Kindb.
Racomitrium Macounii, Kindb.
Cinclidium Macounii, Kindb.
Eurhynchium Macounii, Kindb.
Heterocladium Macounii, Best.
Neckera Macounii, C.M. & Kindb.
Timmia Macounii, Kindb.

LICHENS.

Biatora Macounii, Eckfeldt.
Pannaria Macounii, Tuckerm.

HEPATICEAE.

Anthoceros Macounii, Howe.
Cephalozia Macounii, Aust.
Cololejeunea Macounii, Spruce.
Fossombronina Macounii, Aust.
Lophocolea Macounii, Aust.
Odontoschisma Macounii, Aust.

ECHINODERMS—STARFISH.

Leptasterias macouni, Verrill.

MOLLUSKS.

Boreotrophon macouni, Dall and Bartsch.

Turbonilla (*Pyrogolampros*) *macouni*, Dall and Bartsch.

INSECTS—BUTTERFLY.

Oeneis macounii, Edwards.

FISH.

Chauliodus macouni, Bean.

Total, 45 species.

Until the year before he died he continued quite active, but his heart finally gave him trouble, and following a severe attack of whooping cough in the spring of 1920 his vitality was much lowered and after less than a week's confinement to the house he died at Sidney, Vancouver Island, on July 18. During the last few months of his life, when he could no longer go far from home, it was his delight, under the name of "Rambler," to name plants sent in for identification through the local paper, the Sidney Review. After his death the following tribute appeared in that paper: "Rambler" is dead. The beautiful flowers of the forest, which he loved so well, will never again receive the gentle touch of "Rambler." The flowers among which he spent the greater part of his life will miss him no less than those of our readers who took much interest and received great pleasure from this department of the Review. Professor John Macoun, ("Rambler"), died last Sunday morning."

He had many strong and outstanding personal characteristics. His determination and perseverance are marked through all his early explorations, and many accounts might be related where it was nothing but sheer determination that carried him safely through perilous and exhaustive situations. After his recovery from the paralytic stroke in 1912, which left his right hand in such condition that he could not write with it, he determined to write with his left, and from that time on did so in a very legible handwriting. He could never be idle and had nothing to regret in his old age over wasted days and nights, for he worked both night and day until a few years before his death, when he spent his evenings in reading. He was a very wide reader and kept himself well posted on the events of the world to the very last, and, having been a great reader for so many years, he was a veritable encyclopedia. He had a wonderfully retentive memory, and could give the year and the day of the month where he had been when anything out of the ordinary occurred in his personal experience apparently back to his childhood. He could give the scientific name on sight of thousands of flowering plants, mosses, lichens, liveworts, and fungi.

His quickness in this respect was remarkable, but quickness was one of his strong characteristics both in his actions and in his speech. His repartee was so keen that he was seldom, if ever, cornered in an argument, and he delighted in discussing any matter of general or personal interest. He had an extremely logical mind and had great power of accurate deduction when given a few important facts. He was very emphatic in his statements, and his enthusiasm was so great that the combination of these two characteristics made his personality a striking one. With these two traits, however, went a very humorous disposition, and many an audience and individual went into bursts of laughter over his way of putting things. His honesty was proverbial and he was very frank and outspoken in regard to wrongdoing. He was kind and generous not only to his family and near friends but to those from whom he did not expect to receive anything in return. He believed that there was an Overruling Power, but that men had much to do in shaping their own destiny.

Perhaps the strongest trait in Professor Macoun's character was a sympathetic understanding of his fellow-men, one that made him hosts of friends and a much sought advisor in questions of doubt and difficulty. The honesty of his opinion and the straightforwardness with which his advice was given, in conjunction with his sympathetic manner of giving it, secured for him a respect and affection that lasted a lifetime. His wonderful magnetism and ready tact constituted him a leader of men, and had his great abilities turned to statesmanship he would have been a great power for the good of his country. He was a true Imperialist and a firm believer in the strength and integrity of the British Empire.

His dearest wish was to live until the termination of the Great War, every phase of which he studied with the most intense interest, and his fervent hope was that he might be spared to see a proper readjustment of subsequent world conditions, and a fulfilment of the high ideals that were at stake.

Prof. Macoun was a Presbyterian in religion, and was an elder in St. Andrew's Church, Ottawa, for many years previous to his departure for British Columbia in 1912.

He was married in 1862 to Miss Ellen Terrill, Wooler, Ont., who survives him. His children are: Mrs. A. O. Wheeler, Sidney, B.C.; Mrs. R. A. Kingman, Wallingford, Vt.; Mrs. W. M. Everall, Victoria, B.C.; and Mr. W. T. Macoun, Dominion Horticulturist, Experimental Farm, Ottawa, Ont. His eldest son, Mr. James M. Macoun, Chief of the Biological Division of the Geological Survey, predeceased him by a few months.

W.T.M.

BOOK REVIEW.

REPORT OF THE SECOND NORWEGIAN ARCTIC EXPEDITION IN THE "FRAM," 1898-1902, 4 volumes in 36 parts, large octavo, 1907-1919, 9 maps, 111 plates, and 2,071 pages of text. Published by the Society of Arts and Sciences of Kristiania (Videnskabs-Selskabet i Kristiania), at the expense of the Fridtjof Nansen Fund for the Advancement of Science.

The separate reports of what is sometimes known as the Sverdrup expedition have finally been completed and issued in collected form. The original papers have been published from time to time since the return of the expedition eighteen years ago, and well illustrate how the side lines or by-products of such an enterprise may show their value long after the more spectacular features have been more or less forgotten.

The First Norwegian Arctic expedition, under Dr. Fridtjof Nansen, had the attainment of the North Pole for its main object. After the return of this expedition, Captain Otto Sverdrup, who had been the navigating officer of the *Fram*, returned to the Arctic to explore and map portions of the American Arctic island archipelago. The lands explored by this expedition, Ellesmere island, and the later discovered Axel Heiberg island, Amund Ringnes island, and Ellef Ringnes island, are in the territory of the Dominion of Canada, and their history and resources should be of interest to Canadians. The ship *Fram* was furnished by the Norwegian government, and the remainder of the expense of the four years' expedition, about \$60,000, was borne by Consul Axel Heiberg and the Ringnes brothers of Kristiania, and their names are perpetuated in the new lands discovered. The expedition explored and mapped about 100,000 square miles, the greater part of which is new territory.

Captain Sverdrup was assisted by fifteen men. The scientific results were largely the work of G. I. Isachsen the cartographer, H. G. Simmons the botanist, Edward Bay the zoologist, and Per Schei the geologist. In reviewing their work, in *Science*, August, 1920, Prof. Charles Schuchert (Yale University) says: "A better fitted and a more loyal band of hard workers—both men of science and sailors—never explored unknown lands. . . . It is a source of regret that Per Schei did not live to see the final working up of his grand geologic collections, since all attest that this warm-hearted man of science collected a vast mass of material; in fact it may be said of him that he made accessible to paleontology and stratigraphy more information of an exact nature than all previous Arctic expeditions.

"These four volumes, together with Captain Sverdrup's popular account, entitled "New Land" (2 volumes, 1904), should be in every scientific library, not only because of their great intrinsic value, but because we owe it to our Norwegian friends thus to show our appreciation of their splendid achievement."

The astronomical and geodetic observations are worked up by G. I. Isachsen, (141 pages), terrestrial magnetism by A. S. Steen (82 pages), meteorology by H. Mohn (399 pages). The botanical collections by Dr. H. G. Simmons (University of Lund, Sweden) amounted to over 50,000 specimens, and are described in eight papers. Dr. Simmons described the vascular flora, about 190 species, showing that Ellesmere island has at least 115 flowering plants which in general are a continuation of the flora of Greenland although there is a strong American trait that has come from the west. E. Rostrup lists 80 forms of fungi. From over 7,000 specimens of lichens, O. V. Darbishire describes 161 forms. N. Bryhn describes 290 forms of mosses, of which 49 are new. F. Ingvarson identified samples of driftwood from the shores and elevated beach lines, and discusses their origin and source. 18 species of migrant water birds and 5 species of land birds are recorded, as well as 9 kinds of mammals (polar bear, wolf, fox, ermine, glutton, lemming, hare, muskox, and reindeer). Of the Crustacea, G. O. Sars describes 154 kinds, including copepods (71), amphipods (38), isopods (11), and ostracods (11). H. H. Gran discusses the phytoplankton, which form the bulk of animal subsistence. 53 species of Mollusca and one brachiopod are described by J. A. Grieg; about 50 kinds of bottom-living Foraminifera by H. Kiaer; and 77 species of bryozoans by O. Nordgaard. The Echinodermata are described by Grieg and include 2 crinoids, 6 starfish, 6 ophiurids, 4 holothurians, and 1 sea-urchin. The remainder of the marine fauna include 2 sponges, 4 actinians, 6 sea-squirts, 10 hydroids, 4 medusae, and 44 kinds of polychaete worms.

The very rich geologic results of Per Schei were remarkable for the abundance and variety of the fossils collected, and also for the record of the distribution of the various formations. These showed that the Archeozoic granites of Ellesmere island are overlain by about 14,000 feet of Paleozoic strata, beginning with Upper Cambrian, followed by basal Ordovician (Beekmantown), middle Ordovician, early and middle Silurian, and an extraordinary development of Devonian. The Carboniferous is known only in the highest Pennsylvanian rocks,

followed by marine Upper Triassic. Then there is no sedimentary record of any kind until the deposition of the Miocene fresh-water beds with lignites. As Per Schei died soon after the return of the expedition, the fossils are described by O. Hiltedahl. The land plants of the Upper Devonian and the very few from the Miocene are described by A. G. Nathorst; the Devonian fishes by J. Kiaer; the Devonian invertebrates by O. E. Mayer and S. Loewe; the Upper Carboniferous fauna by T. Tschernyschew and P. Stepanow; and the Triassic marine invertebrates by E. Kittl.

Points of interest to be noted are the richness of plant life in certain spots during the very short growing season. It was noted that flora was most abundant on granite lands and least developed on Paleozoic limestone. It was richest on bird grounds and around Eskimo habitations, and on the whole was sufficient to support the few land animals. The waters are alive with animal life, from minute forms to seals, walrus and whales. The marine fauna does not include a great variety of species, but makes up for this in the abundance of individuals.

R. M. ANDERSON.

NOTES AND OBSERVATIONS.

A PIGEON HAWK WINTERS AT OTTAWA—The past winter 1919-20 with its heavy snow and extreme cold could scarcely have been a worse one for any bird wintering north of its usual range. However that may be, a Pigeon Hawk (*Falco columbarius*) did spend part of the winter in Ottawa and was seen in Mr. E. G. White's garden from January 8th to February 4th, 1920. This sojourn gave an opportunity to study its food habits to a certain extent. It braved the great cold of January during which month the thermometer registered 29° F. below zero on at least one occasion.

Mr. White had many chances to observe it during that time and we both watched it through field glasses for about half an hour on February 2nd.

During its stay it often flew among Mr. White's pigeons, but apparently took no toll of them. It was observed eating a House sparrow on January 9th, and captured a Pine Grosbeak shortly before my visit on February 2nd, strewn its feathers about the garden. Chickadees were apparently beneath its notice, and on February 4th, it remained peacefully on its perch while a Ruffed Grouse budded the bare upper limbs of an adjacent crab-apple tree.

Consultation of some of the bird literature shows that this species occurs occasionally in Quebec and Ontario in winter, although its winter range extends to South America.

Some recorded winter occurrences are:

Fleming: *Auk*, Vol. XXIV, 1907, p. 73—Given in the Canadian Journal, 1, 1852-3, as a winter resident at Toronto in 1853.

Nash: Occasionally seen at Toronto in winter.

Terrell: *Ottawa Naturalist*, Vol. XXIV, 1910, p. 39—One seen at Compton County, Quebec, December 2—15, 1909; and *ibid*—seen at Montreal, Quebec, on December 9, 1908; January 2nd and January 30th, 1909.

HOYES LLOYD.

THE BIRDS OF THE WILDERNESS OF NOVA SCOTIA—On pp. 36 and 37 of *The Canadian Field-Naturalist*, Vol. XXXIV, No. 2, February, 1920, Mr. H. A. P. Smith, of Digby, N.S., tells of noticing an absence of birds, especially song birds, in the interior wilderness of Nova Scotia, and enumerates the ten species which he has found there, one of which, the Song sparrow, he has observed there but once.

It would appear that either Mr. Smith has been very unfortunate in the times and places of his journeys into the Nova Scotia wilds, or that in some way he has overlooked many birds ordinarily to be found there in the breeding season. On the open sphagnum bog, it is true, birds may be scarce, but if there are a few bushes and dead stubs, the White-throated sparrow, the Maryland Yellowthroat, and the Chestnut-sided warbler are almost certain to be present. Among the granite boulders the Nighthawk lays its eggs, at the numerous lakes Spotted Sandpipers, Leons, Great Blue Herons, Herring Gulls, and Great Black-backed Gulls frequently occur, and, where even a small area of woodland has escaped the fire and the axe, Hermit Thrushes, Magnolia Warblers, Chickadees, Redstarts, and a great variety of other woodland birds proclaim their presence.

I have had the pleasure of making a number of journeys into the interior of Nova Scotia, and while, unfortunately, I did not always make notes on the birds, especially the common birds, to be found there, yet I am able to state that I have observed at least fifty-nine species of birds in the Nova Scotia wilderness, the home of the moose and the wild-cat. As the avifauna of Nova Scotia is fairly well known, no attempt will be made to take up space here by enumerating these species (to which no doubt many more might be added) in detail, but the following resume of them may serve to prevent any impression that the interior of

Nova Scotia lacks bird songs in the season of song. The observations on which this summary is based were made in the counties of Yarmouth, Kings, and Halifax.

Loon, 2 Gulls, Great Blue Heron, 3 Snipe, Canada Ruffed Grouse, Barred Owl, Belted Kingfisher, 3 Woodpeckers, Nighthawk, Ruby-throated Hummingbird, 3 Flycatchers, 2 Jays, Northern Raven, Crow, Rusty Blackbird, 7 Finches, Tree Swallow, 2 Vireos, 18 Warblers, Winter Wren, Redbreasted Nuthatch, 2 Chickadees, Ruby-crowned Kinglet, 3 Thrushes.

HARRISON F. LEWIS, BERGERVILLE, P.Q.

PROSECUTIONS, MIGRATORY BIRDS CONVENTION ACT AND NORTHWEST GAME ACT BY OFFICERS OF THE DOMINION PARKS BRANCH AND ROYAL CANADIAN MOUNTED POLICE.

MIGRATORY BIRDS CONVENTION ACT.

George Albert Culbert, Boisevain, Manitoba, for having four live Blue-winged Teal—Fine \$10.00.

Fred Z. Boudreau, Boudreauville, Petit de Grat, Cape Breton, N.S., shooting one Red-breasted Merganser—Fine \$10.00.

Geoffrey Jeffries, Louldale, Richmond Co., Cape Breton, N.S., shooting one Red-breasted Merganser—Fine \$10.00.

Murray Wilson, New Waterford, Cape Breton, N.S., shooting a Black Guillemot—Fine \$10.00.

Frederick Mason, Tancook Islands, N.S., shooting Mergansers in P.E.I.—Fine \$10.00.

Marcus Schnare, Tancook Islands, N.S., shooting Mergansers in P.E.I.—Fine \$10.00.

Sabeen Allen, Upper Cape, Westmoreland Co., N.B., shooting a Merganser—case dismissed.

Lloyd Smith, Chebogue, Yarmouth Co., N.S., possession of Canada Geese—Fine \$40.00 and costs.

Harold Cain, Arcadia, Yarmouth Co., N.S., shooting at a Bittern—Fine \$10.00 and costs.

James Paynter, Clinton, P.E.I., selling Canada Geese—Fine \$10.00 and costs.

James Paynter, Clinton, P.E.I., possession of parts of Canada Geese—case dismissed.

Wesley Paynter, French River, P.E.I., possession of Canada Geese—Fine \$10.00 and costs.

Charles Paynter, Long River, P.E.I., possession of Canada Geese—case dismissed.

Robert Gibbles, Petite Lamec, Shippigan, N.B., serving Canada Goose at meals—case dismissed.

NORTHWEST GAME ACT.

Peter Alexey (Indian) Husky River, for killing Mountain Sheep—Penalty—7 sheep hides, 1 head and carcasses. Seized and forfeited.

ACCESSIONS TO THE MUSEUM OF THE GEOLOGICAL SURVEY, CANADA—The Museum of the Geological Survey, the *de facto* if not the *de jure* National Museum of Canada has received lately two donations of more than ordinary importance.

One is from Mr. W. E. Saunders, of London, Ont., well known as an enthusiastic and public spirited naturalist. It consists of duplicates which in a life-time's work he has naturally gathered in his private collecting and which he feels would fill a larger sphere of usefulness in the National collections. They number 922 bird and 103 mammal skins. The great value of this particular collection lies in the fact that it contains many specimens collected at comparatively early dates and represent conditions passed beyond recall and upon which we have little or no other data.

The other contribution was made by Mr. Ernest Thompson Seton, who is too well known to require particular personal mention here. It consists of some 102 bird skins and an important collection of zoological books and pamphlets. The former is more notable from the original and unique records it contains than for numbers and the latter includes many rare papers and the proceedings of some small or defunct learned societies that are difficult to obtain.

These donations form valuable additions to our National collections which constitute the basis of exact ornithological work in Canada and as such will be of assistance to all present and future ornithological workers in the Dominion.

P. A. TAVERNER.

THE NAME OF THE "ENGLISH SPARROW"—The House Sparrow, of Europe, since its introduction into America, has been so popularly called the "English Sparrow" that it hardly seems worth while to endeavor to return to the correct designation. Since the beginning of the war, however, there have been some suggestions of obvious intent, to call this undesirable citizen the "Prussian Sparrow." The proposal however is purely academic and there seems little chance that a name so firmly established can be changed in current usage even by the best intentions of the loyal friends of England. During the war, however, there have been some changes in the scientific name of this bird that are interesting to the general public as well as the nomenclaturist.

In *Falco*, No. 2, Dec. 2, 1905, Kleinschmidt, of obvious nationality, separated the bird of the British isles from the continental form under the name of *Passer hostilis* thus commemorating to some degree the Song of Hate in scientific nomenclature. H. C. Oberholser, *Auk*, 1917, 329, states that

whilst the British and the Continental forms may be distinct, the difference is only subspecific and hence the insular bird should stand as *Passer domesticus hostilis*. As undoubtedly our birds are descendants of English stock the same name applies to them. Thus though it does not seem that "Prussian Sparrow" can ever be substituted for "English Sparrow" in this country we really accomplish the same and by a sort of reflex action the opposite of the intention of the original describer, in calling it *hostilis*, the enemy.

P. A. TAVERNER.

LANTERN SLIDES FOR EDUCATIONAL PURPOSES.—For some time the Biological Division of the Geological Survey of Canada has maintained a collection of lantern slides for free educational use. This collection covers about three hundred slides of various natural history subjects. They are mostly from original photographs taken by officers of the Survey though some have been kindly donated by other photographic naturalists. Most of them are unusually well colored and of great photographic as well as zoological interest. The series is still far from complete but it is being added to as rapidly as possible and already it is possible to illustrate a great number of subjects by its means. Birds are principally represented but mammals, amphibians and reptiles are also included in the series.

Collections of these slides are loaned freely to any responsible person or institution to be used for educational purposes and not for personal profit. The only conditions attached to their use are, that they be returned promptly with a report on the occasion of their use and that the borrower pays express charges, if any, and makes good losses not due to ordinary wear and tear.

It is regretted that distance makes it impossible to extend this service west in the prairie provinces, or to the Pacific coast at present, but plans are now being considered for having duplicate sets distributed from the branch offices of the Survey in Edmonton and Vancouver.

Any one desiring to use these slides should make written request to the Biological Division of the Geological Survey, Ottawa, stating his official position, if any, the subject of the lecture it is proposed to illustrate, the society, institution or audience to be addressed, or under whose auspices the gathering is to be held, the number and kind of slides desired and the date. The application should be made well in advance so that conflict of dates can be adjusted. The slides should be returned promptly that others who may be waiting for them and have dates already set may not be disappointed.

P. A. TAVERNER,

Ornithologist, Geological Survey, Ottawa, Ont.

BIRD MIGRATION.—In the May, 1919 number of THE CANADIAN FIELD-NATURALIST there is an article on the above subject by Mr. H. Mousley containing statements which can hardly be allowed to pass unchallenged.

Mr. Mousley rejects as "one of the fairy tales of science" the theory that birds during migration find their way by the sense of sight. He states that "in pure nature there is no such thing as self-consciousness, or the power of reasoning," yet he admits that these faculties are found in man. If man is not a part of "pure nature" then we are forced to the conclusion that he must be regarded as super-natural, a conclusion with which I think few scientific men will agree. Further this statement is not in accord with carefully conducted observations and experiments on the higher animals. Mr. Mousley goes on to say that some of the higher animals, such as dogs, horses, etc., from long and intimate association with man, no doubt at times display traces of it, that is, of self-consciousness or reason. This statement again is contrary to all the data furnished by the study of animal psychology, since no entirely new type of mental process, such as reason, can possibly be evolved by association with man, and all that man can do in the training of animals is to make use of, and develop more fully, faculties already possessed by the animals in question.

Mr. Mousley continues: "All wild birds and animals, however, I believe, are subconscious, and therein lies the secret of their making no mistakes." The onus of proof that wild animals "make no mistakes" is upon Mr. Mousley. If this were true it would be most fortunate for them, but I fancy any close observer of wild life can recall cases in which wild animals have made mistakes, mistakes which in many instances have cost them their lives.

The next statement is: "To understand this more fully one must be prepared to accept the fact that telepathy (now recognized by science) pervades and is general throughout the entire animal kingdom. It is a potential faculty (working on an astral plane unknown to us at present) which interconnects subconscious mind, and permits silent intercourse to be established." I would venture to suggest that telepathy is far from being recognized by the majority of scientific men, that the idea of "astral planes" is regarded by most biologists as a phantasy, and that there is absolutely no proof that any mind can communicate with any other mind, save through the medium of the senses of hearing, sight, touch or smell.

But Mr. Mousley goes even further than relying on telepathy to account for the directing of migra-

tion and brings in "telaesthesia," which he defines as "power of vision passing the limits of time and space." One can readily see what a very useful power this would be, a power more wonderful than all the gifts of prophecy and fairy wands, but one must be allowed to express a slight doubt as to its existence.

If birds are possessed of this miraculous power it is rather hard to account for the fact of their becoming lost in a fog when migrating. A fog certainly might cause them to lose direction if they depended on the sense of sight, but it should have no influence on a purely mental attribute, such as "telaesthesia" is assumed to be.

In conclusion I would suggest that if the guiding of migration by the sense of sight is to be regarded as one of "the fairy-tales of science" that Mr. Mousley's theory may be regarded as "fairy-talaesthesia."

A. BROOKER KLUGH.

A DOPED BUTTERFLY?—Early in September last year in woods on the shore of Lake Missanog, Frontenac County, Ontario, I came across a patch of very large specimens of the poisonous Fly Agaric, *Amanita muscaria*. On the pileus of one of the specimens was a Camberwell Beauty, *Eupanesia antiopa*. It did not take flight when I touched it but merely wobbled weakly from side to side. I picked it up and let it go in the air, but it fell to the ground with closed wings. I then placed it on the trunk of a tree, to which it clung for a few minutes, and then fluttered back to the same fungus, where I left it.

It would seem as if this butterfly had been poisoned by muscarine, the extremely toxic alkaloid found in *Amanita muscaria*, though no absolute conclusion on this point can be drawn from this single instance. Its behaviour in returning to its poisonous repast is interesting, but here again no definite conclusions can be drawn from a single instance. I should be glad to hear of any other observations on the relations of insects to this fungus.

A. BROOKER KLUGH.

MORCHELLA BISPORA IN CANADA. Mr. W. S. Odell's note in a recent number of *The Canadian Field-Naturalist*, apparently constitutes the first published record of the finding of *M. bispora*. The Division of Botany, Central Experimental Farm, some years ago (1912) studied some Morels collected by Mr. J. W. Eastham, B.Sc., near Billings Bridge; among them Mr. Eastham showed me *Morchella bispora*, and I well remember the charac-

teristic ascus containing the two large hyaline spores. There is no doubt in my mind that the species then examined is the same as that recorded by Mr. Odell.

H. T. GUSSOW.

MORCHELLA BISPORA IN CANADA.—I was interested in the article "A Rare Fungus New to Canada," by Mr. W. S. Odell in the January number of *The Canadian Field-Naturalist* in which he records *Morchella bispora* from Chelsea, Quebec, and from the vicinity of Ottawa, but I beg to point out that his statement that "There is no record of its having been previously found in Canada," requires modification. In the Ontario Natural Science Bulletin, No. 6, 1910, I first recorded this species from Canada and I reproduce below the original note:—

"*Morchella bispora* is a very common fungus on the Bruce Peninsula, Ontario. It grows abundantly in damp woods, appearing in May, and lasting till early in June. Some of the sporophores attain a very large size. As an edible species it ranks high, as it is tender and of excellent flavour. Dr. Dearness informs me that this species has not been previously recorded from Canada."

The fact that records of the occurrence of species of plants and animals in Canada can be easily overlooked shows the need of some central authority for each group. Such an authority should not be a worker in the group but should be willing to receive and keep on file all records of the distribution of species in his group. I would suggest that the Ottawa Field-Naturalists' Club try and make such arrangements for as many groups as possible, and publish the names of the authorities, so that anyone wishing information on the distribution of species in a certain group can appeal to the proper authority. In this connection I should be extremely glad to receive records of all species of Cyanophyceae (Blue-green Algae), Chlorophyceae (Green Algae) and fresh-water Protozoa of Canada.

A. BROOKER KLUGH.

RUSTY BLACKBIRDS WINTERING IN ALBERTA.—A flock of eleven Rusty Blackbirds have remained in Camrose, Alberta, throughout the past winter. The winter of 1919 and 1920 has been as severe, and perhaps longer than any since the settlement of this portion of the west. The ground was frozen several inches deep by October 10th, and on the 18th of that month eight inches of snow covered the ground. On November 6th the thermometer registered 24 below zero, on which day a flock of Evening Grosbeaks began their residence in Cam-

rose for three months. There were several breaks in the weather before the New Year, but by the middle of January it became very severe, and the thermometer showed 55 below zero for several days towards the end of the month.

The winter came on with such suddenness that many birds must have perished, likely more from want of food than from the terrible cold. On November 4th, tree sparrows and juncos were very plentiful, and seemed to be in an excited condition of mind, being more restless than the chickadees that were with them. On the 10th of the month some boys brought me a Richardson's Owl that they had taken from the limb of a small poplar, even he, seemed to be chilled to the bone and did not resist capture. Before Christmas the snow was 20 inches deep on the level, and a month later I measured it in the woods and found it to be over 30 inches.

Late in January I happened to be at the stockyards one afternoon, and was very much surprised to hear the note of a blackbird, and on looking around saw a flock of eleven Rusty Blackbirds. Most of them were feeding on a stack of oat sheaves, while a few were sitting on the high fence that surrounds the yards. On enquiry I was told that they had been there since the first cold spell, and that on fine days they generally made a flight out to the neighboring farms, always returning before evening. None of the men could say where the birds spent the night, but thought they must have crawled into the stacks or the many crannies around the buildings.

On several occasions after, I visited the yards to see how the birds were wintering, and always found them in the very best of spirits. On very cold days they seemed to be occupied mostly in keeping their feet covered from the frost, this was done by squatting down and spreading out their feathers very much like the way the Horned lark acts while on the ground. Warm afternoons seemed to brighten them up, and feeble attempts were made at chorus singing, but not with the same vigor as is shown by them in the fall before leaving for the South. At this date (March 26th) the flock is seen daily flying to various parts of the town in search of different foods, and there are indications of their mating, six are males and five females. Their plumage is commencing to assume the lustre of spring birds.

Now the question must arise, why have these birds remained through such a long cold winter?

Camrose is on the 53rd Meridian, nearly three hundred miles north of the Montana and Dakota lines.

Did they know that this great distance separated them from a more congenial clime, and would not take the chance of a flight that might necessitate a stop where feed and shelter were uncertain? Something told them they had remained too long last fall, and that it would be best for them to accept the hospitality of the stockyards, rather than make an effort to cross several hundred miles of uncharted snow covered plains!

FRANK L. FARLEY.

A UNIQUE ENTOMOLOGICAL EXPERIENCE.—

While in camp at Lake Missanag, Ontario, during September, I collected a specimen of *Pedicia albivittata*, a large Crane-fly with black markings on the wings. I placed the specimen in the cyanide bottle fully expecting that, after the usual manner of Crane-flies, it would shed several of its long and loosely-attached legs, and my anticipations were fulfilled by its losing three of these appendages. I removed it from the cyanide bottle, pinned it, and proceeded to stick the three lost legs on with Le-Page's glue. In this process, which was one of some difficulty and demanded considerable accuracy of manipulation, one of the legs broke at the tibio-femoral joint, but I succeeded in joining it together again and attaching it to the body.

Half an hour after I looked at the specimen to see if all the appendages were still secure, when I observed, to my intense astonishment, that *the leg which had been broken in two was waving up and down*. None of the other appendages were moving and upon touching the abdomen the insect showed no signs of life. This leg continued to wave about for an hour or so, and early next morning it was still moving, and continued to do so intermittently until noon.

The only explanation of this peculiar episode which I can suggest is that some substance, possibly acetic acid in the glue, acted on the muscles of the leg, causing them to contract, and the broken leg moved because it had received a double dose of this substance.

A. BROOKER KLUGH.





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NOTES ON THE FAUNA OF THE MOOSE RIVER AND THE MATTAGAMI AND ABITIBI TRIBUTARIES.*

BY M. Y. WILLIAMS.

INTRODUCTION.

During a geological trip made in the summer of 1919, between the National Transcontinental railway, and Moose Factory, the writer gathered the information contained in this article, on the fauna of the region.

The trip was made by canoe, from Fauquier on the Transcontinental railway down the Groundhog river to Mattagami river, down this to Moose river and thence to Moose Factory, which is situated below tide water nine miles up river from James bay. The return route was up Moose river to the mouth of Abitibi river, up this river to Frederick House river and up this river to the landing near Clute, fourteen miles northwest of Cochrane.

The journey was commenced on August 1st, and was completed on September 5th. Rainy weather between the 22nd and 28th of August delayed travel, and hindered observations materially.

The region traversed is wooded, except for burnt areas, some of which are old and of large extent. The clay belt as seen at Cochrane extends far down river, with the muskeg areas probably predominating over the clay ridges. High sand hills are crossed in the Abitibi canyon, and are reported elsewhere. The region south of James bay is covered with marine silt which is more fertile than the soil of the clay belt.

The rivers have incised their channels from fifty to two hundred feet into the loose deposits, their character, whether slow, rapid or torrential depending upon the rock outcrops. Above the foot of the Long Portage on Mattagami river, and the Otter portage on Abitibi river, the streams are broken, by many rapids and falls, the intervening stretches of water being either slack or of moderate current; this region is underlain by pre-Cambrian gneisses, and other crystalline rocks. Lower down, the country is underlain by limestone, sandstone and shale, and the rivers have few interruptions, although long stretches of rapids occur where the rock flows over

limestone and shale ledges.

The river banks commonly rise twenty to fifty feet to a narrow terrace. This terrace which averages about 200 feet in depth, slopes upward to the general level of the country, which is principally muskeg,—a floor of spagnum moss, laurel, and Labrador tea, studded sparsely with black spruce. The terraces are well timbered with stands of white birch, white and black poplar, and white spruce. Where the region is underlain by pre-Cambrian rocks, white cedar, Jack pine, and some tamarack occur. At the water's edge, and on the sand-bars, willows and dogwood grow in dense masses, and during the summer, golden rod, and even red clover grow along the banks at favourable places.

A distinct difference is to be noted between the water of Mattagami and Abitibi rivers. The water of the former is dark in colour, but reasonably clear, while that of the latter is very muddy. This probably accounts for the absence on the Abitibi of fish ducks, fish hawks, and other birds which prey upon fish, although these occur commonly on the Mattagami. Fishing on the Abitibi is likewise very poor.

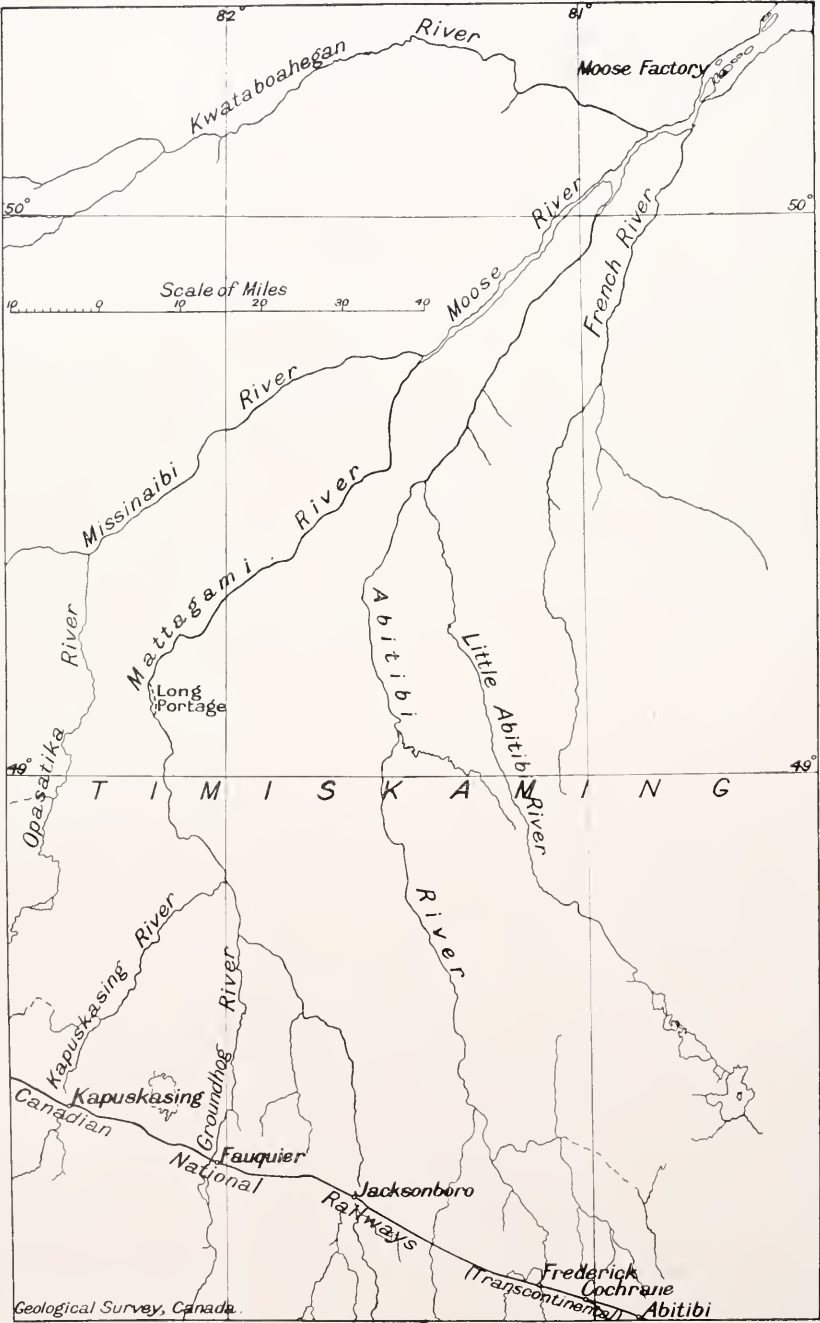
BIRDS.

COMMON LOON, *Cavia immer*. Two seen at mouth of Kapuskasing river on August 4th, flying from the direction of a small lake lying to the east.

HERRING GULL, *Larus argentatus*. Generally common along the Kapuskasing, Mattagami, and Moose rivers from the National Transcontinental railway to Moose Factory, and up as far as the second rapids above the mouth of the Abitibi river. The greatest number were seen on the Mattagami river between the mouth of the Groundhog and the foot of the Long Portage. One was seen at the foot of the Long Rapids on the Abitibi river. Immature birds in grey plumage were seen on three occasions, one being shot near the second rapids above the mouth of the Abitibi river on August 25th. Dates of observation, August 1st to 29th.

COMMON TERN, *Sterna hirundo*. Several seen almost every day spent between Moose Factory,

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Index Map, Moose River and lower Mattagami and Abitibi Rivers, Ontario.

Blacksmith's rapids and on the Abitibi river; dates August 17th to 28th. Two were shot, a male and female in adult plumage on August 19th and 20th, one on Bushy island, and one opposite the mouth of the French river.

AMERICAN MERGANSER, *Mergus americanus*. Three adults and several half-grown young were observed on the lower Groundhog river on August 3rd; about thirty young and old on Mattagami above the Long Rapids on August 11th; eighteen off the mouth of Missinaibi river on August 14th; one off mouth of Abitibi river on August 17th.

BLAUG DUCK, *Anas rubripes*. Observed as follows:—One near La Duke rapids, Groundhog river, August 3rd; two adults and 2 immature on the lower Groundhog on August 3rd; one immature being shot; thirty off mouth of Abitibi on August 17th; two shot on Abitibi river, four miles above its mouth; one seen at second rapids of Abitibi river; ten about ten miles below Blacksmith rapids of Abitibi river; eight just below Coral Portage of Abitibi river.

GOLDEN-EYE, *Clangula clangula*. A pair on ponds below Long Portage, Mattagami river, August 8th, the female collected. A few others, not identified with certainty along Moose river.

CANADA GOOSE, *Branta canadensis*. One adult in pond at mouth of Pike creek, Mattagami river; one immature at Grand Rapids, Mattagami river; five seen on Abitibi river at second rapids above its mouth.

GREAT BLUE HERON, *Ardea herodias*. One at La Duke rapids, Groundhog river; one at New Post, Abitibi river.

CRANE, *Grus canadensis*, sp.? Fresh tracks on sand bar at low tide, on Moose river, opposite mouth of French river, August 20th. Tracks of three toes, rather thick, and about two inches in length.

WILSON'S SNIPE, *Gallinago delicata*. One seen at Moose Factory, August 18th.

SEMPALMATED SANDPIPER, *Ereunetes pusillus*. One male shot at foot of Long Rapids, Abitibi river.

GREATER YELLOW-LEGS, *Totanus melanoleucus*. One came into camp on Long Portage, Mattagami river, August 6th; three seen on Moose river at mouth of Abitibi river August 17th; five on Bushy island, August 19th; two opposite mouth of French river, August 20th; three at mouth of Abitibi August 21st; two at mouth of Abitibi river, August 23rd.

SPOTTED SANDPIPER, *Actites macularia*. Two seen at Cochrane, July 30th. Several were seen almost every day of the journey between August 1st and September 1st. One immature bird was collected on Moose river opposite the mouth of the French river, August 21st.

SEMPALMATED PLOVER, *Aegialitis semipalmata*. A flock of thirty seen at Moose Factory, August

18th; a flock, probably of this species on Abitibi river about 4 miles above its mouth, on August 23rd.

RUFFED GROUSE, *Bonasa umbellus*. One male taken on the Little Long Portage of Mattagami river, August 5th; two immature taken at Blacksmith rapids, Abitibi river, August 28th, and two more seen.

MARSH HAWK, *Circus hudsonius*. One seen at mouth of Missinaibi river, August 14th; and others seen on Moose river, as follows:—one at Grey Goose island, August 15th; one at crossing of Niven's line, August 16th; one at Bushy island, August 19th; one at mouth of French river, August 20th; one at mouth of Abitibi, August 21st. One was seen at the Coral portage on the Abitibi river on August 30th. All were in brown plumage.

SHARP-SHINNED HAWK, *Accipiter velox*. One seen on Long Portage, Mattagami river, August 8th. A small hawk, probably of this species at Niven's line on Moose river, August 16th. On Abitibi river as follows:—one about 4 miles above mouth August 23rd; one near Niven's line, August 26th; one at foot Long Rapids, August 29th; one at Coral Portage, August 30th; one at Red Sucker Creek, September 3rd; one at Cochrane, September 6th.

COOPER'S HAWK, *Accipiter cooperi*. Doubtful identifications. Niven's line, Moose river, August 16th; and second rapids above mouth of Abitibi river, August 24th. Two birds were clearly recognized as belonging to this species, one about ten miles below Blacksmith's rapids on the Abitibi river, August 27th, and the other at Blacksmith's rapids, on August 28th.

RED-TAILED HAWK, *Buteo borealis*. One at Hamilton rapids, Groundhog river, August 2nd; one at Pike creek, Mattagami river, August 11th; a fine adult with red tail at mouth of Missinaibi river, August 14th.

EAGLE, *Haliaeetus leucocephalus*, sp.? A dark-coloured eagle was seen near the crossing of Niven's line on Moose river, August 16th.

AMERICAN SPARROW HAWK, *Falco sparverius*. Five seen at Cochrane, July 30th. Two birds of this species, or else *columbarius* were seen along the lower Groundhog river. Birds satisfactorily identified were seen, one on the Long Portage of Mattagami river, on August 7th; one at the mouth of Missinaibi river on August 14th; two at the crossing of Niven's line on Moose river on August 16th; one at the mouth of Red Sucker creek, Abitibi river, September 3rd; and one at Cochrane, September 6th.

OSPREY, *Pandion haliaetus carolinensis*. Two were seen at the lignite claims on Mattagami river on August 11th, and one the following day at the Grand Rapids. On Moose river, two were seen at

the crossing of Niven's line, August 16th, and one at the mouth of Abitibi river on August 17th. On Abitibi river one was seen at the foot of the Long Rapids on August 29th, and one at the Coral Portage on August 30th.

GREAT HORNED OWL, *Bubo virginianus*. One seen at Three Carrying places, Abitibi river, Sept. 4th, and one was heard that night at our camp a few miles up Frederick House river.

HAWK OWL, *Surnia ulula*. One seen west of Cochrane, July 29th.

BELTED KINGFISHER, *Ceryle alcyon*. One seen at Cochrane, July 29th. Commonly distributed along the lower Groundhog, Mattagami, Moose, and Abitibi rivers, two or more being seen almost every day throughout the trip. The muddy waters of the Abitibi river did not appear to have the same influence on the distribution of the Kingfisher, as on most other fish-eating species. In all between thirty-five and forty individuals were seen between August 1st and September 5th.

ARCTIC THREE-TOED WOODPECKER, *Picoides arcticus*. None seen on rivers, but one individual seen on September 5th in a grove about nine miles northwest of Cochrane.

YELLOW-BELLIED SAPSUCKER, *Sphyrapicus varius*. One immature male shot on island at mouth of Missinaibi river, August 14th.

PILEATED WOODPECKER, *Phlocotomus pileatus*. A note probably made by this species was heard by the writer near Clute, twelve miles northwest of Cochrane, September 5th.

FLICKER, *Colaptes auratus*. Several seen at Cochrane, July 28th. Two seen on Mattagami river, one opposite mouth of Pike creek, August 11th, and one at Grand Rapids on August 12th. On Abitibi river, one below Niven's line, August 25th, one at same location on August 26th; one at foot of Long Rapids on August 29th; one near mouth of Frederick House river, September 4th.

NIGHT HAWK, *Chordeiles virginianus*. Two were seen at Cochrane, July 29th. Several seen every day between the lower Groundhog and the Long Portage, of Mattagami river, August 3rd to 8th, and several seen each day between the Grand rapids of Mattagami and Grey Goose island, Moose river, August 12th to 15th.

CANADA JAY, *Perisoreus canadensis*. Probably much more common than the number observed would indicate, due to their habit of remaining in seclusion until the camp site is abandoned. One heard on Groundhog river, August 1st; Mattagami river, Long Rapids, one seen each day, August 7th, 8th, and 9th. Moose river, one seen opposite mouth of French river, August 20th; Abitibi river, heard near mouth, on August 23rd and 24th; two seen near second rapids above mouth on 24th; one near

Niven's line on 25th; four at same locality on 26th; two at Blacksmith's rapids on 28th; one at foot of Long Rapids on 29th; two at Coral portage on 30th. One male collected near New Post on September 1st.

RAVEN, *Corvus corax*. Seen on Mattagami river, as follows:—one below mouth of Groundhog, August 3rd; two on Long Portage, August 10th, and one on 11th; three at mouth of Missinaibi, August 14th; two on Moose river, near Niven's line, August 16th. On Abitibi river:—one at mouth, August 17th; one at Second rapids above mouth, August 24th; one at Blacksmith's rapids, August 28th, one at foot Long Portage, August 29th; one at Coral Portage, August 30th; one at New Post, September 1st; one at Frederick House, September 4th.

AMERICAN CROW, *Corvus brachyrhynchos*. Several seen at Clute, September 5th.

HOUSE SPARROW, *Passer domesticus*. Three seen at Moose Factory, August 18th. Mr. McLeod, Factor at New Post, but formerly of Moose Factory, says that the sparrows came to Moose Factory about eight years ago, and that many die every winter.

AMERICAN GOLDFINCH, *Astragalinus tristis*, sp.? Fifteen birds probably of this species, but possibly Pine Siskins, were seen on the Lower Groundhog river, August 3rd.

SAVANNAH SPARROW, *Passerculus sandwichensis*. One specimen taken at the foot of the Long Portage, Mattagami river, August 8th. These sparrows are so dark in colour as to be quite unlike the Savannah sparrows of Southern Ontario; the commonest sparrow of Moose river and the tributaries travelled.

WHITE-THROATED SPARROW, *Zonotrichia albicollis*. Fairly common, being either seen or heard almost every day of the trip. In song until August 27th.

JUNCO, *Junco hyemalis*. Well distributed. Mattagami river:—Long Portage, several August 8th; Pike Creek, two August 11th; Grand Rapids, two, August 13th. Abitibi river:—mouth, two August 17th; four miles above mouth, two, August 23rd; at Second rapids, above mouth, common, August 24th; Blacksmith's rapids, two, August 28th; Long portage, several September 2nd; Frederick House, river, common, Sept. 5th.

SWAMP SPARROW, *Melospiza georgiana*. Birds doubtfully referred to this species were seen August 13th and 14th, on the Grand rapids of Mattagami river, and again on the Second rapids above the mouth of the Abitibi river, on August 24th.

TREE SWALLOW, *Iridoprocne bicolor*. Several observed on the Groundhog river on August 2nd and 3rd, and on Mattagami river at the Long rapids on August 7th. A single bird at the second rapids above the mouth of the Abitibi on August 24th.

BANK SWALLOW, *Riparia riparia*. Nests common along Grand Rapids of Mattagami river, and also on Mocse river near Niven's line. Six birds seen near mouth of Abitibi river, August 17th. Nests common near Niven's line on Abitibi river.

CEDAR WAXWING, *Bombycilla cedrorum*. On Groundhog river common August 1st to 3rd. Several on Little Long Portage, Mattagami river, August 5th. Several at Bushy island, Moose river, August 20th. Heard on Lower Abitibi August 23rd and 24th. Common at Blacksmith's rapids, and at foot of Long Portage, Abitibi river, August 28th and 29th.

RED-EYED VIREO, *Vireosylva olivacea*. Mattagami river:—one taken at foot of Long Portage, August 8th. Very common there on 8th and 9th; one at Grand rapids, August 11th. Several seen below Niven's line, Abitibi river, August 26th.

MYRTLE WARBLER, *Dendroica coronata*. Two at Grand rapids, Mattagami river, August 12th.

AMERICAN REDSTART, *Setophaga ruticilla*. One immature male taken near mouth of Abitibi river, August 21st. Several others seen.

MARYLAND YELLOW-THROAT, *Geothlypis trichas*. One seen on lower Abitibi river, August 24th.

BLACK-CAPPED CHICKADEE, *Penthestes atricapillus*. Commonly seen or heard on the portages throughout the trip.

HERMIT THRUSH, *Hylocichla guttata*. One seen at Long Portage, Mattagami river, August 7th.

AMERICAN ROBIN, *Planesticus migratorius*. Common on Groundhog, August 1st and 2nd, nest and two young, on branch five feet above bridge on Long Portage, Mattagami river, August 6th. Heard at mouth of Missinaibi river, August 15th. Two seen on Bushy island, Moose river, August 19th; heard at foot of Long Rapids, Abitibi river, August 29th; one seen at New Post, September 1st.

MAMMALS.

SHREW, *Sorex*, sp.? One seen near Lignite claims, Mattagami river, August 11th.

BLACK BEAR, *Ursus americanus*. One swam across river ahead of the canoes near Wawadasing rapids, Mattagami river, August 5th. Tracks at mouth of Missinaibi river, August 14th. Destruction of dogwood bushes due to bears common along Abitibi river below mouth of Frederick House river, September 4th.

GREY WOLF, *Canis occidentalis*. Tracks identified by Indian guides as those of wolves, common along Mattagami and Moose rivers, August 3rd-14th.

BEARDED SEAL, *Erignathus barbatus*. One taken near Moose Factory on August 18th. Others seen

on bars in river near Moose Factory.

CHIPMUNK, *Eutamias quadrivittatus borealis*. Seen occasionally on the portages of all the rivers travelled. One taken at Long Rapids, Mattagami river, August 12th.

RED SQUIRREL, *Sciurus hudsonicus*. Fairly common in heavier timber. One taken at foot of Long Portage, Mattagami river, August 8th.

BEAVER, *Castor canadensis*. Signs fairly common above Grand Rapids, Mattagami river, where an adult was seen in company with young on August 5th.

NORTHERN HARE, *Lepus americanus*. One young one caught in snare near camp at Whist Falls, Groundhog river, August 2nd. No others seen on trip.

MOOSE, *Alces americanus*. One killed by Indian, seen near Little Long Portage, Mattagami river, August 4th. A large bull killed by campers above Grand Rapids, August 5th. A yearling bull killed by our party near Lignite claims, Mattagami river, August 11th. Tracks common at mouth of Missinaibi river.

BATRACHIANS.

NORTHERN FROG, *Rana septentrionalis*? Several seen at Little Long Portage, Mattagami river, August 4th. One seen at Moose Factory, August 18th.

AMERICAN TOAD, *Bufo lentiginosus*. One specimen of a pink shade and small size seen near head of Long Rapids, Mattagami river, August 11th. One seen at Missinaibi river, August 14th; several large and small at Moose Factory, August 18th; one on August 22nd, and one on 23rd on Abitibi river three-quarters of a mile above its mouth.

REPTILES.

GARTER SNAKE, *Thamnophis sirtalis*. One seen on Little Long Portage, Mattagami river, August 4th.

FISH.

LAKE STURGEON, *Acipenser rubicundus*? One large sturgeon seen by my men on the Long Rapids of the Mattagami river.

PIKE, *Lucius lucius*. Common and very large in pools at foot of Long Portage, Mattagami river. Taken up to twelve pounds in weight, August 6th and 7th.

PICKEREL, *Stizostedion vitreum*. Common along Groundhog and Mattagami rivers. Taken up to nine pounds in weight at foot of Long Portage, Mattagami river, August 6th and 7th.

SUCKER, *Moxostoma*, sp.? One dead on shore near foot of Long Rapids, Mattagami river, August 12th.

INSECTS.

MOSQUITOES. Not very numerous along rivers, except at mouth of Missinaibi. Very plentiful at Moose Factory, on August 18th and 19th, and in

general below tide water.

MOURNING CLOAK BUTTERFLY, *Aglais antiopa* L. Two seen near foot of Long Rapids, Mattagami river, August 13th.

THE LARGER FRESHWATER CRUSTACEA OF CANADA AND ALASKA.

BY FRITS JOHANSEN.

INTRODUCTION.

Though the freshwater-crustacea are of great importance as food for fishes, birds, water-insects, etc., occurring in vast numbers even in ponds, and certain of them (Malacostraca) are conspicuous enough by their size, their occurrence in Canada and Alaska has been little studied, apart from cray-fishes. A. G. Huntsman has already called attention to this fact in his "Freshwater-Malacostraca of Ontario," (Contributions to Canadian Biology 1911-14, Fasc. II, p. 145), and he also there emphasizes how comparatively little is known about their habits and life-histories, on which their distribution in and their introduction into the innumerable ponds, creeks and lakes in Canada depends.

So far as Alaska is concerned cray-fishes are not found there (they may occur in southern Alaska), and the other freshwater-crustacea do not seem to have appealed much to the many collectors in that territory as of sufficient interest, even to the extent of their picking up a few odd specimens, so easily secured by pulling up water plants, by using a catcher from the margin of a lake or pond, or by examining stomachs of fishes caught. The writer has had personal experience of how common freshwater-crustacea are along the arctic coast of Alaska, and it is to be hoped that future collectors will connect up the collections made here with the data secured in the western provinces of Canada, by an examination of the bodies of freshwater in the more southern parts of Alaska and of Yukon Territory, so easily accessible all the year round.* As is the case for the United States so also for Canada the hitherto published records of freshwater-crustacea refer mainly to the Great Lakes and their ramifications and tributaries. The present writer has only a few new data or collections to record from this area, and has only a tourist's acquaintance with these extensive bodies of water. The present article therefore does not claim to treat the basin of the Great Lakes exhaustively; other writers are more qualified to do so, and as mentioned, these bodies of

freshwater have been studied fairly well before (see bibliography), even Georgian Bay and other purely Canadian (Ontario) localities (Huntsman).

But, thanks to the efforts of various Canadian expeditions and collectors quite a few freshwater-crustacea have been collected in Canada and the arctic part of Alaska, in various ponds, lakes and streams, particularly in more recent years. I have gone over most of the larger forms from the collections (Amphipods, Isopods, Phyllopods), except cray-fishes, in the possession of the various museums in Canada; and by letters and words I have tried to stimulate the securing of further data, in particular from hitherto quite unrepresented areas. The result has been most gratifying and the time seems now opportune to publish these many data, which perhaps will create a still greater interest in the subject. I may add that the freshwater-crustacea (Amphipoda, Phyllopoda, Cladocera, Copepoda, Ostracoda) I secured along the arctic coast of America while with the southern party of the Canadian Arctic Expedition, 1913-16, are treated in detail by various specialists in Volume VII, of the scientific reports of the said expedition (Ottawa, 1920), so I need only here refer to these reports.

To give an idea of the many widely separated localities in Canada and Alaska from which we (mainly the Victoria Memorial Museum, Ottawa) have specimens of freshwater-crustacea I mention the following places:—Teller (Port Clarence); Point Barrow, Camden Bay, Demarcation Point and Herschel Island, along the north coast of Alaska and Yukon Territory; International Boundary line between New Rampart House and Arctic coast; Cape Bathurst and various places on the south side of Dolphin and Union Strait in Arctic Canada; Fullerton on the west side of Hudson Bay; east coast of Grinnell land; Labrador coast and Newfoundland; western, northern and eastern coasts of Greenland (collections in Copenhagen); west side of Cape Breton island, N.S.; Nova Scotia, (according to Dr. Marsh's and Juday's letters to me of March 10, 11, 1920); Magdalen islands, Tadousac and Quebec City, P. Que.;

*See recent collections recorded by Pearse (1913).

Thousand islands, N.Y.; Great Lakes; neighbourhoods of Montreal, Ottawa and Hull; various localities in middle and southern Ontario; a few localities in the middle and southern parts of Yukon Territory and the four western provinces, Manitoba, Saskatchewan, Alberta and British Columbia.

The freshwater-crustacea known from the localities given above are in some cases both Malacostraca and Entomostraca; in other cases only one of these two sub-classes; in again other cases only certain orders belonging to one or the other of these sub-classes have been collected; finally it is often only certain families or genera which occur in these more northern parts of the American continent.

The freshwater Entomostraca are mostly circumpolar in distribution, and are perhaps best treated from this point of view (as will be seen from the Canadian Arctic Expedition reports); and as the available records of them have been published rather fully in various countries, I do not intend to include such, in this article, apart from the Phyllopoda (Branchiopoda).

The freshwater Malacostraca occurring in Canada and Alaska are, however, properly to be considered continental forms, outrunners from their much more numerous representatives in the United States. It is interesting to recall in this connection, that no Decapods or Isopods are known from the arctic and subarctic regions of Canada and Alaska; and that though the Amphipods are known to occur all the way to the arctic coast of the mainland (at least west of Hudson Bay), there are no records of them hitherto from the islands composing the Canadian Arctic Archipelago, though they are probably found at least on the more southern islands. That no freshwater Malacostraca are known from Greenland is also significant. The details about this most interesting point (the distribution northward) will be given later in these articles; suffice it is to say now that the Decapoda going farthest north are certain species of cray fishes; and of Isopods and Amphipods probably only the three common forms, *Asellus communis*, *Gammarus limnaeus* and *Hyaella knickerbockeri*.

Unfortunately we have practically no records of freshwater Crustacea from the vast area outside the localities given above for this continent, except in so far as certain species (*Gammarus limnaeus*, *Hyaella knickerbockeri*), which are distributed over the whole of the mainland part of Canada and Alaska or more southern species (*Mancasellus tenax*, certain Amphipods and cray-fishes), are concerned. It is, therefore, most desirable that material be collected in the following two areas; the whole subarctic part of the continent from Alaska to the Labrador Peninsula (Ungava), and the islands composing the Canadian Arctic Archipelago. It is

my hope, that future collectors in these regions will pay far more attention to the freshwater-crustacea than has been done heretofore. Each collection will have considerable value, not only from a scientific but also from an economic point of view, particularly in a country like Canada where the freshwater occupies at least fifteen per cent of its total area, and the fish living therein which depend so largely upon these crustacea form one of our great national assets.

AMPHIPODA.

The general appearance of these crustacea, the great majority of which are found in the sea, (about two dozen species occurring in freshwater upon this continent), may be supposed to be fairly well known to the general public, who will have noticed them in great numbers in the small pools around stones or under sea-weed along beaches at low tide. They are commonly called "shrimps," though this name properly should only be used for certain "Decapod" crustacea (prawns, etc.) "Sea-weed-lice" or "beach-fleas" are really better names and are popularly used, for instance in the Scandinavian countries. Ortmann (l.c.) gives "scuds" as the popular English name for them. The main characteristics of these crustacea are an arched outline and a compressed, many segmented body; the lack of carapace and of stalked eyes; the feelers (antennae) and legs are also considerably shorter than in the true "shrimps." They swim mostly vertically in the water by bendings of the body and rapid, continuous movements of the paired "tail feet" (pleopods), while the body-legs (peraeopods) help in the balancing of the animal and the mouthparts (maxillipeds) are kept ready for any food. When they reach the water surface it will often be seen that they seem unable to descend again, and swim around in circles on their sides. The reason for this is that the air gets in under the protruding parts (pleura) of the body segments (somites), so that the animals become lighter than the water. They feed mainly upon decaying animal and vegetable matter, and are therefore, especially the smaller forms, often found among water plants, etc. It is well known how quickly meat-bones, dead fishes, etc., lowered into the sea or a lake are gnawed clean by these crustacea, so that only the skeleton-parts remain. In size they range from a few centimetres to some giant, marine, forms, several inches long. The females carry their many eggs in a sort of brood-pouch on the underside of the body between the legs, and the embryos go through their whole development here, so that when they are "born" they have practically the same appearance as their parents, a rather unusual thing among the crustacea. Even the recently emerged young ones keep for a

while to their mother and remain inside the brood-pouch, so that when such a mother animal is caught, if placed in a glass of water and disturbed by being touched with a stick, a stream of tiny young ones will be seen leaving the mother and swimming around in the water just as do the full grown amphipods. The time in the summer in which the birth of the first brood takes place in Canada and Alaska depends somewhat on the particular species and upon the latitude and longitude. Generally, it may be said, that it takes place about a month after the freshwater-ice begins to melt in the spring, in the neighborhood of Ottawa it happens in May; on the arctic coast west of Coronation gulf, Northwest Territories, in July. There seems to be an interval of two months between two successive broods at least during the summer, (May to Sept. inclusive), and probably a still longer period between the broods during the winter (October to April inclusive).

In the same way as is the case with the marine forms, which await the return of the tide upon the sand under moist sea-weed, so also are the freshwater Amphipods very tenacious to life. They will congregate under stones, boards, etc., or be found along the margin of large lakes under washed up material. It is likewise interesting that certain species at least are equally at home in sluggish, almost putrid water and in running creeks and clear mountain lakes, and that they are found in the alkali lakes of our western provinces as well as in the ponds hidden in the woods all over the country, and in springs as well as in arctic lakes. Their importance as fish-food may be gathered from the fact, that I have found the stomachs of trouts from lakes in the arctic literally "stuffed" with these crustacea, in the same way as the marine species make up the main food of fishes, seals and sea-birds in the Arctic and as is also known, in more southern latitudes.

As to the detailed difference between the various species of freshwater-amphipods known from Canada and Alaska I refer the reader to C. R. Shoemaker's report (1920) and A. G. Huntsman's paper (1915), mentioned in the introduction. A key to the determination of all the freshwater crustacea (Malacostraca), occurring in North America is given in Ortmann's article (1918), (see also bibliography for other papers).

Three families of freshwater amphipods occur on this continent all of which are represented in Canada, but probably only two of them in Alaska. The two first families are distinguished from the third (Orchestiidae) by the presence of a secondary short flagellum on the 2nd antennae (antennula), and by the fact that the last pair of tail feet (uropods) are not single, but divided into two parts (rami).

The first family (Lysianassidae) is again easily distinguished by the fact, that the 5th pair of body-legs (peraeopods) are considerably shorter than the preceding ones, a rather unique feature among the amphipods. There is only one fresh-water genus (*Pontoporeia*) belonging to this family recorded from this continent and it is doubtful whether there is more than one species, (*P. hoyi*, Smith) though two other species (varieties) have been recorded, (*P. filicornis* and *P. affinis*). On this continent the first two have so far only been found in freshwater, (deeper parts of Lakes Superior, Michigan, Ontario, Georgian Bay), the last named only in the sea.

The second family (Gammaridae) is represented upon this continent by half a dozen genera, of which however only three are known from Canada, a fourth has so far been found only in Alaska, and the rest occur in caves, and underground wells in the United States. The one Alaskan genus is a small form (*Synurella johanseni*) which I myself found in the tundra ponds at Teller, Seward Peninsula, in August, 1913. It is figured and described in detail by C. R. Shoemaker (1920). It is not likely to be found in Canada as it belongs to an Alaskan and Eurasian genus, thus reminding one strikingly of the phyllopod genus, *Polyartemia*. One of the three genera found in Canada is *Eucrangonyx*, which is distinguished from the other Canadian genus *Gammarus* by having the inner ramus of the uropods rudimentary, and by not having the tail-end (telson) nearly so deeply cleft as is the case with *Gammarus*. The shape of *Eucrangonyx* is more clumsy than that of a *Gammarus* of corresponding size. There is only one species of *Eucrangonyx* (*E. gracilis*, Smith) in Canada, hitherto known from the Great Lakes, (Superior, Michigan and Huron), Georgian Bay and Bond Lake (Toronto), while in the United States it is distributed from Rhode Island to Wisconsin. Outside of the Great Lake system it seems to be limited to Ontario and the Ottawa valley, judging from the following new records:—

De Grassi Point, W.-shore of Lake Simcoe, Ont. May 10, 30, 1917, E. M. Walker, coll., 6 specimens (4 of these are from a large, temporary forest-pool). About 30, (less than 1/2 cm. long) specimens from ponds near Bond Lake, York County, Toronto, Ont., April 19, 1920, A. G. Huntsman, coll. Collected by myself, surroundings of Ottawa, Ont.: (1) McKay Lake, Rockcliffe, April 13th, 1919, (1 small (5 mm.) immature specimen). (2) Pool-stream in swamp at Deschenes Rapids, P.Q., April 20, 1919, 4 specimens (6-10 mm.), of which two were immature, one full grown male and one mature female with many pink eggs (1/2 mm. in diameter, shape oval). (3) Fairy Lake, P.Q., May 4, 1919.

One full-grown female with pink eggs. (4) 10 specimens, pool near Gatineau Point, P.Q., May 13, 1917, (3 of the females with eggs). (5) Several specimens (all sizes; full grown female with eggs), from pool at Catfish Bay, Hull, P.Q., May 16th, 1920. (6) Pool in woods at Rockcliffe, Ont., May 24, 1919, one full grown female with newborn young in the brood-pouch. (7) Bight in Ottawa River, Hull Park, P.Q., July 6, 1919; under stones, several specimens mostly full grown females with ripe eggs and young in brood-pouch. Two young specimens from Montreal West, Que., Oct. 19, 1918, A. Willey, coll.

Some interesting facts about the life history of this species will be gleaned from the above new records. There thus seems to be at least two broods each summer, one in May, the other in July, and probably also one in September, in the surroundings of Ottawa. Its frequent occurrence in temporary pools, bights or streams is also noteworthy, and it reminds one of what is known about the phyllopods. When full grown its size is about double that of *Hyaella*, but only half of that of *Gammarus*. It is not nearly so frequent as these two species (*H. knickerbockeri*, *G. limnaeus*), though at certain places where it is found it may be common enough, (see above under (2), Deschenes).

Though the color of freshwater amphipods is to a large extent caused by the immediate surroundings and their food, the color of *Eucrangonyx gracilis* is like that of green glass, changing to yellowish or orange in the females at the time the eggs ripen. Its geographical distribution has already been referred to.

Of the genus *Gammarus* we have two species in Canada, of which one (*G. fasciatus*) hardly occurs here at all (outside of the Great Lakes); but the other (*G. limnaeus*) is found over the whole width and breadth of the mainland part of the Dominion and Alaska. *G. fasciatus* is known from Niagara River and Lakes Superior and Michigan, also from Georgian Bay. In the United States it is found from Maine to Wisconsin. It is common enough where it occurs according to various authors (Huntsman, Shoemaker) but I have never observed or collected it myself. It resembles very much the other, more widely distributed species *G. limnaeus*, and the young of the two species are very difficult to separate.

Gammarus limnaeus is differentiated from its near relative *G. fasciatus* by the fact that the long hairs upon the terminal joint of the outer ramus of the uropods, are plumose, and not simple; a character only to be ascertained by the aid of the microscope and with not too young or imperfect specimens. It is interesting to note, that while *G. fasciatus*, as mentioned above has only a limited range in Can-

ada, *G. limnaeus* is distributed over the whole width and breadth of the Dominion* from the American border to the Arctic ocean, the reverse is the case as one goes south on this continent. Mr. Shoemaker tells me, that at Washington, D.C., *G. fasciatus* is far more common than *G. limnaeus*. The latter species is found in larger pools in lakes and in streams, the younger individuals having the habit of hiding under stones and vegetation (moss, algae, etc.), the older ones swimming around freely. As I observed them in the arctic they seem to be found only in lakes which owing to their depth do not freeze to the bottom during the winter, or in creeks (rivers) which were open (or partly so) all the year round. Where they occur in temporary pools and streams at more southern latitudes it can, according to my own observations (Ottawa and St. Lawrence rivers), mostly be explained by the fact that these temporary bodies of water were in connection with the rivers or large lakes earlier in the season, and the amphipods, therefore, probably migrated into them at that time. In the arctic I found them during the period October to June inclusive, when the lakes had thick ice and generally just below the ice. I suppose their main food then is the many Entomostraca (copepods) swarming here. That they live a pelagic life is also indicated by the fact that the many trout caught here had their stomachs filled with them at that period. When the lakes are free of ice or when the ice is thin (July to September inclusive) the amphipods literally swarm in shallow water along the margin of the lake, and seem to find their food more among the many plants (moss, algae) on the stones in such situations. The detailed data for the specimens of this species collected on the Arctic coast (Sadlerochit River, Alaska, Herschel Osland, Yukon Territory, Bernard Harbour, Northwest Territories) have been recorded on p. 16 in Shoemaker's report. Mr. Shoemaker tells me, that the specimens from the warm spring creek tributary to Sadlerochit River, and which lived in water of a temperature from 40° to above 60° F., cannot be distinguished from those from the other arctic localities except perhaps by their average, smaller size.

Curiously enough, egg-bearing females of this very common species, which I have observed so often at many localities in Canada are far less frequently† met with than is the case with the more rare *Eucrangonyx gracilis*; it is perhaps because the

*Huntsman says (l.c.) p. 151 that this species is much less abundant in the waters examined than *G. fasciatus*; but he did not then know of the many records of *G. limnaeus* from various parts of the Dominion now secured.

†Two of the specimens collected in Whitefish Creek, Lake Simcoe, Ont., June 17, 1917, by E. M. Walker were egg-bearing females.

development of the *Gammarus* eggs takes place in much shorter time, and are thus not carried for so long a period by the mother-animal compared with *Eucrangonyx*. The young ones are probably born in May, July and September in the latitude of the Great Lakes. *Gammarus limnacus* is said to range in the United States from Maine to Utah, and has formerly been recorded from Lakes Superior, Michigan and Georgian Bay. It has also (Pearse, 1913) been recorded from lakes in the neighborhood of White Horse, Yukon Territory and Rampart House, Alaska (Porcupine River). I have (beside the Arctic ones mentioned above) a number of hitherto unpublished records from additional localities, which I give here, arranging them from east to west,—

Observed (animals escaped) in pool at Tadoussac, P.Q., September 6th, 1919; young individuals.

Stream-pool between St. Lawrence River and Diamond Hill, Quebec City, September 19, 1919; many specimens (4.9 mm. long.)

Bight at Alexandra Bay, N.Y. (Thousand Islands), September 1st, 1919; many specimens up to 10 mm. long (females with eggs.)

I have not yet found this species around Ottawa, though the two smaller freshwater-amphipods, (*Eucrangonyx gracilis*, and *Hyaella knickerbockeri*) are common here; but Prof. E. M. Walker, of Toronto, has sent me some (1½ doz.) full grown specimens of this species collected near Whitefish Creek, Lake Simcoe, Ont., on June 17, 1917.

From Manitoba I have before me ten specimens, full grown, about (2 cm. long) collected by E. Criddle, at Treesbank, (Assiniboine River), November 21, 1917; and two specimens (1 smaller, one almost full grown), from Cross Lake (about lat. 54 ½° N.) collected by F. J. Alcock in the summer of 1919.

I have no records of this species from Saskatchewan, though it undoubtedly occurs there, having been found both in Manitoba and in Alberta.

From Alberta I have before me twenty-seven specimens, about 2 cm. long, from Dodds Lake, near Edmonton, collected by a university student there on March 8, 1919 and sent to me by Dr. McLean Fraser of Nanaimo, B.C.

Also ½ dozen specimens from Miquelon Lake, Alberta (about lat. 53° N.), collected on September 30, 1918, by R. M. Anderson, of Ottawa.

Many specimens (mostly full grown) from a marsh in Cabin Lake Creek, Jasper Park, collected by W. Spreadborough, on Aug. 31, 1918.

Also 1½ doz. specimens from the plain near Red Deer and Battle Rivers, east of the foothills, Alberta (about lat. 53° N.) collected by J. B. Tyrrell, June to September, 1885.

From British Columbia I have examined the fol-

lowing specimens:—

Three large ones from Sink Lake, near Stephen, E. Kootenay county, B.C., September 26, 1883, J. B. Tyrrell, collector.

Half a dozen from Beaver Pond in valley of Kish-e-nek-na creek, (Flathead River, near International Boundary, B.C.) August 27, 1883, J. B. Tyrrell, collector.

We now come to the third family of freshwater-amphipods, namely the Orchestiidae, represented by only one species on this continent—the common *Hyaella (allorchestes) knickerbockeri*, Bate. The other species (*H. azteca* Lauss, *H. dentata*, Smith, *H. inermis* Smith) described formerly have proved to be only varieties. In addition to the characters given for the family, (p. 128) this amphipod is immediately recognized by the presence of a curved spine projecting backwards from the middle of the posterior margin of each of the first two abdominal segments, a character which can be seen with the aid of a strong magnifying glass, and reminds one strongly of certain marine (especially arctic) amphipods.*

The biology of *Hyaella knickerbockeri* has been studied by various naturalists and a rather full account of it has been given by H. H. T. Jackson (1912). He says it is a littoral form, only occurring to the depth of about one fathom of water in larger lakes, and that it prefers sluggish streams and lakes, etc., with much vegetation. He states that it feeds almost exclusively on protozoa and algae, which it gets by swimming or crawling. He found it was more active at night than during the day time, also that there was much variety in its color, and that the latter was not solely due to food in the intestine (compare *Eucrangonyx gracilis*, p. 129). The largest specimen he observed was 7.6 mm. long; the females average less than the males in length, but are deeper in the body. According to the author quoted, the species breeds throughout the year, but especially during the summer; while thus engaged the male carries the female, though releasing his hold when the moulting takes place. Soon after copulation the eggs pass into the ovarian sack (brood-pouch) of the female, but they take almost a month to hatch. Jackson paid particular attention to the moults. He found, that there is a varying period (1 to 5 weeks) between the moultings, and that each moult begins with a transverse split in the fore-part of the body. Contrary to what is the case with many crustacea (for example the cray fishes) the moulted skins are not eaten by these amphipods after being cast. My own observations on the biology of this animal agree with those of Jackson except that he says it does not occur in temporary

*Shape of *Hyaella* is more robust and rounded than *Eucrangonyx* of corresponding size (see p. 129).

pools. In the district of Ottawa, however, it does occur in such pools as will be seen below. On June 22, 1919, I collected a dozen specimens of this species in McKay Lake, Rockcliffe, near Ottawa, the males were often seen embracing (carrying) the females, which had many newborn young in the brood-pouch. When I placed the amphipods in a glass with water the young ones came forth and swam freely around; rather larger examples, but still minute (2 mm. long) ones, were secured in Pink Lake, outside of Hull, P.Q., on September 22, 1919, so there must be several broods during the summer, probably at least every second month.

This species has an exceedingly wide distribution on this continent. It has been recorded from Lake Tititaca, Peru; in United States from Maine to Florida and Wisconsin and across to Mexico, California and Oregon; also 48 miles north of Rampart House, Alaska. The only records of it from Canada were formerly White Horse, Yukon Territory and the Great Lakes (Superior, Ontario, Erie, Georgian Bay) and southern Canada. I am able here to add a number of others, which show that this species occurs in Canada from the Atlantic to the Pacific and from the international boundary line in the south to a considerable distance northward, though it probably does not approach the barren grounds of Alaska and Canada. It would be most desirable to secure data to define the northern limit of this species; I did not find it along the arctic coast west of Coronation Gulf, although *Gammarus limnaeus* is common enough there. As both these amphipods are found in great numbers wherever they occur, and are easily observed and collected it should be a comparatively simple matter to get further data.

The following unpublished records of this species in Canada are based upon specimens in the Victoria Memorial Museum, Ottawa; except where otherwise stated they were all collected by me.

Four young ones from Pembroke Lake, Grand Etang, West side of Cape Breton Island,* N.S., September 2, 1917; under stones.

Three full grown specimens (1 male, 2 females) from pond on Amherst Island, Magdalen Island,* P.Q., middle of July, 1917.

Two small ones from pool at Tadousac, P.Q., September 6, 1919. Several specimens (smaller) from bight of canal at Alexandria Bay, Thousand Islands, N.Y., September 1, 1919.

A great number of specimens of all sizes and both sexes from the surroundings of Ottawa, Ont., and Hull, P.Q., in 1918 and 1919 from June to October (inclusive), both from pools, ponds, lakes,

streams and bights of the Ottawa river. More definite Ottawa district localities are:—McLaurin Bay, Gatineau Point, outside the city of Hull, Fairy Lake, the Golf Club grounds, Pink Lake, etc., all on the Quebec side; and McKay Lake, Rockcliffe, etc., on the Ontario side. There is hardly a pool, stream or lake around Ottawa where it does not occur in great numbers.

One young specimen from creek (barred at mouth) emptying into Lake Nipissing, near North Bay, Ont., Aug. 25, 1918; among water-plants.

Three specimens from Cross Lake, Manitoba, summer, 1919, F. J. Alcock, collector.

I have no records from Saskatchewan.

Half a dozen specimens from Miquelon and Dry Meat Lake, Alberta (near Camrose), September 30, 1918, R. M. Anderson.

A couple of specimens from stream pool in woods in Jasper Park, (near Jasper station) Alberta, September, 1916.

One dozen specimens from Beaver Pond in valley of Kish-e-neh-na creek (Flathead river) B.C., August 27, 1883, J. B. Tyrrell, collector.

To sum up, our present knowledge of the distribution of freshwater amphipods in Canada and Alaska is as follows:

One species seems to be limited to the western part of Arctic Alaska; three others to the Great Lakes, the Ottawa Valley and southern Ontario, while two occur from the Atlantic to the Pacific. One of these probably does not reach the barren grounds, while the other is found as far north as the arctic coast, and may thus be termed the only true Canadian species.

Note:—In Europe there occur in freshwater,—*Gammarus pulex* and *G. fluviatilis*. The genus *Gammarus* is known already from tertiary deposits.

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POSTSCRIPT.

The summer of 1920, I spent in James Bay, and along the east side of Hudson Bay to beyond lat. 56° N. No phyllopods nor isopods were found in freshwater, and amphipods only in James Bay, at the following places:

Gammarus limnaeus in creek-pools on the south-east side of Charlton Island, September 26 and 22.

Hyaella knickerbockeri in creek-pools in the interior of Charlton Island (south-end), July 17 and September 22; and in ponds at Moose Factory (field), July to October, and on Cape Hope Islands (about lat. 52½° N.), September 13.

All occurred in great numbers. Those secured at Moose Factory in July, comprised greenish males and yellow-brown, egg-bearing females, in copulation, besides pale, newborn ones.

CHANGES IN THE STATUS OF CERTAIN BIRDS IN THE VICINITY OF QUEBEC, P.Q.

BY HARRISON F. LEWIS.

In the year 1906, Mr. C. E. Dionne published his well-known work, "Les Oiseaux de la Province de Québec," in which, besides noting the distribution of the species of birds in Quebec Province, he stated particularly the status of the different species in the neighborhood of Quebec City, where the greater part of his own field work had been done. The area to which these local records refer is variously designated by Mr. Dionne as "près de Québec," "dans les environs de Québec," or "dans Québec," and is defined by him (footnote (1), page 20) as "within a radius of five or six leagues of Quebec, unless otherwise indicated." Since the publication of this book, Mr. Dionne has been able to do comparatively little field-work in this area.

Since July, 1918, I have been resident at Bergerville, parish of St. Colomb de Sillery, in the suburbs of Quebec, and have done such field work (chiefly in 1919 and 1920) in the vicinity of the city as my other duties have permitted. This work has made clear the fact that, in the fourteen years since 1906,

the status of a number of bird species in the area defined by Mr. Dionne as referred to above has changed markedly. There is little doubt that most, if not all, of such changes which I have noted are actual, since Mr. Dionne frequently visited in his work the vicinity of Bergerville and Gomin Wood, where most of my work has been done, although he went even more often to areas northward from Quebec City, where my observations have been occasional only. The majority of my notes relate to land birds; opportunities for observing water birds in the neighborhood where I am resident are very limited. In order to keep the record of birds of the Quebec area as accurately up-to-date as possible, and in order to render readily available some local details of the general avifaunal changes taking place in northeastern North America during the period 1906-1920, I have prepared this paper. A similar paper by Mr. L. McL. Terrill, dealing with the vicinity of Montreal ('Ottawa Nat.', Vol. XXV, No. 4, pp. 57-63, July, 1911), furnished me with the

original suggestion and an admirable model.

In the case of each species of which a change in status is hereinafter noted, I have given, following the English name, a translation of Mr. Dionne's statement concerning his observations on its occurrence here, as found in his book, such translation being terminated by Mr. Dionne's name in parentheses. Then I have summarized my own observations of the species under discussion. In order to ensure that my translations should render the meaning of Mr. Dionne's French sentences as accurately as possible, I have submitted them all to Mr. Dionne, who has most kindly verified them. I am much indebted to Mr. Dionne, not only for this aid, but also for his ever-ready assistance and encouragement in all the work of an ornithological character which I have done at and near Quebec.

The changes of status described in this paper may be divided into the following four classes:

(A) The increase in abundance of many small Warblers, Finches, Vireos, etc., normally of more or less northern breeding range. The chief known factors which may have assisted in causing these birds to increase seem to be their protection by law here and in the United States, the creation of many clearings in the forests of the north, and the absence or rarity of the domestic cat over large parts of their breeding range.

(B) The northeastward advance of five species (Crested Flycatcher, Meadowlark, Vesper Sparrow, Migrant Shrike, and House Wren), originally of more southern or southwestern breeding range. While this may represent the continuation of the northward advance of many species following the close of the last Glacial Period, there is no doubt that it has been greatly accelerated by the cutting of the forests and the settlement of the country by the white race.

(C) The diminution of two species (Eskimo Curlew and Purple Martin), due to very obscure causes.

(D) The accidental occurrence of one species (Blue-gray Gnatcatcher).

The Zone Map of North America, as published inside the front cover of F. M. Chapman's "Handbook of Birds of Eastern North America", 1912 edition, indicates the vicinity of Quebec City to be in the Canadian Zone. The Transition Zone is represented as reaching northeastward along the south bank of the St. Lawrence River about as far as to Levis, P.Q., but as not extending northeast of the Ottawa River on the north bank of the St. Lawrence. The dividing line between the two zones between Montreal and Levis, which is directly opposite Quebec, is thus made to coincide with the St. Lawrence River. There can be little doubt that this is not exactly correct, for the Tran-

sition Zone certainly crosses the Ottawa and extends northeastward along the north bank of the St. Lawrence for some distance. Whether or not it should be considered as reaching to Quebec City is a matter on which opinions may differ. It appears to me, however, that the most nearly correct position for this portion of the necessarily arbitrary dividing line between the Transition and Canadian zones is at the southern foot of the Laurentian Mountains, in general some miles north of the St. Lawrence. This would mean that a strip of the Transition zone extends along the north shore of the St. Lawrence as far as Cap Tourmente, about twenty-five miles below Quebec, where the Laurentians finally front directly on the river. A person standing on the Citadel, or even on Dufferin Terrace, at Quebec, can distinguish at a glance the low-lying cultivated, Transition (?) country immediately around the city and along the St. Lawrence in either direction from the elevated, wooded, undoubtedly Canadian mountainous country behind. The following data concerning the status of certain species of birds about Quebec may be of assistance to those interested in this question:

1. Transition species which are summer residents at Quebec: Virginia Rail (not common), Sora Rail (fairly common), Black-billed Cuckoo (irregular), Kingbird (common), Crested Flycatcher (uncommon), Prairie Horned Lark (fairly common), Bobolink (uncommon), Cowbird (uncommon), Red-winged Blackbird (uncommon), Meadowlark (fairly common), Vesper Sparrow (fairly common), Chipping Sparrow (very common), Purple Martin (rare), Blue-headed Vireo (rare), Catbird (fairly common), House Wren (uncommon), Veery (common), and Bluebird (uncommon).

2. Canadian species which are summer residents at Quebec: Pine Siskin (common), White-throated Sparrow (common), Slate-colored Junco (rare), Lincoln's Sparrow (rare), Philadelphia Vireo (not common), Tennessee Warbler (rare), Myrtle Warbler (rare), Magnolia Warbler (fairly common), Bay-breasted Warbler (rare), Blackburnian Warbler (fairly common), Water-Thrush (fairly common), Mourning Warbler (not common), Canadian Warbler (common), Winter Wren (rare), Red-breasted Nuthatch (rare), Olive-backed Thrush (uncommon), and Hermit Thrush (rare).

266. *Numenius borealis* (Forst.). Eskimo Curlew.

This Curlew is more common than the preceding species [*N. hudsonicus*] and frequently occurs on the beaches and in the fields not far from Quebec (Dionne).

No recent record of this species near Quebec is known to Mr. Dionne or myself.

452. *Myiarchus crinitus* (Linn.). Crested Flycatcher.

Mr. Dionne gives no record for this species near Quebec and has never observed it here. I found it an uncommon summer resident near Quebec in 1919 and in 1920. On August 4, 1919, an adult was seen feeding young birds out of the nest at Bergerville.

459. *Nuttallornis borealis* (Swains.). Olive-sided Flycatcher.

Up to the present I have met but three specimens in the woods near Quebec (Dionne).

I have secured the following records of this species—all of singing males—near Quebec: two on June 3, 1919; one on May 27, 1920; one on May 30, 1920; one on June 3, 1920; and one on July 12, 1920.

501. *Sturnella magna magna* (Linn.). Meadow-lark.

One individual was killed, some years ago, at Jeune-Lorette (Dionne).

In 1919 and 1920 this species was a tolerably common summer resident in the many suitable fields in the vicinity of Quebec.

514. *Hesperiphona vespertina vespertina* (W. Coop.). Evening Grosbeak.

The first one which, to my knowledge, appeared in the neighborhood of Quebec was killed March 11, 1890, at Jeune Lorette. Later, on November 24, 1903, four individuals were killed at L'Ange Gardien, and, in December, three others were taken at Ste-Foy (Dionne).

Mr. Dionne informs me that a few others appeared near Quebec between 1903 and 1919. On December 26, 1919, I saw a flock of this species, containing four adult males and nine dull-colored birds, between Quebec and Ste-Foy. (See 'Bird-Lore,' Vol. XXII, No. 1, p. 15, January-February, 1920, "Christmas Bird Census, 1919, Quebec, P.Q."). During the remainder of the winter of 1919-20 I observed this species near Quebec on twelve additional occasions, the number of individuals noted on any one occasion ranging from one to five. It was last seen on March 26, 1920.

533. *Spinus pinus pinus* (Wils.). Pine Siskin.

Each autumn we see some small flocks of them in the vicinity of Quebec and even in the gardens and parks of the city. Elsewhere also it is common and it spends the winter in the deep woods (Dionne).

In 1919 and 1920 this was a common summer resident about Quebec, but I have not remarked it in winter.

540. *Poocetes gramineus gramineus* (Gmel.). Vesper Sparrow.

It is rare about Quebec; so far I have seen but four specimens of it (Dionne).

This species was a regular and tolerably common

summer resident near Quebec in 1919 and 1920; a few even summered within the city limits.

567. *Junco hyemalis hyemalis* (Linn.). Slate-colored Junco.

It is likewise very common and occurs in flocks in spring and autumn near Quebec and in the neighboring districts; it does not occur here in summer (Dionne).

The Junco is now a rare summer resident in the immediate vicinity of my residence at Bergerville, where I noted it repeatedly during the summers of 1919 and 1920. On June 21, 1919, I saw an adult Junco feeding a young one out of the nest at Bergerville.

583. *Melospiza lincolni lincolni* (Aud.). Lincoln's Sparrow.

It occurs accidentally near Quebec; up to the present time I have killed three specimens only (Dionne).

In May, 1919, I twice observed an individual of this species near Quebec. In 1920, I observed the species near Quebec as follows: May 11 (one), May 18 (one), May 21 (one), May 23 (three), May 24 (one), May 25 (one), May 27 (one), May 28 (one), May 30 (one), May 31 (two), June 1 (one), July 12 (one), July 25 (one), September 26 (one), October 10 (one). I was absent from Quebec from June 5 to June 27 in 1920. I am confident that Lincoln's Sparrow is a rare summer resident in sphagnum swamps in Gomin Wood, near Quebec, where nearly all of the above observations were made.

584. *Melospiza georgiana* (Lath.). Swamp Sparrow.

In the spring of 1878 I killed several specimens of it at the foot of the slope north of the heights of Ste-Foy, but I have seen it nowhere else (Dionne.).

In 1919 and 1920 this species was a tolerably common summer resident in all the many suitable swampy areas which I visited near Quebec.

611. *Progne subis subis* (Linn.). Purple Martin.

It is common at Quebec as well as at Montreal and nests in these places (Dionne).

The Purple Martin was rare at Quebec in the summers of 1919 and 1920. Mr. Dionne informs me that it has been so since about 1909. I saw it more frequently in 1920 than in the preceding year, which leads me to hope that it is now on the increase.

618. *Bombycilla garrula* (Linn.). Bohemian Waxwing.

Couper says that it occurs sometimes, during severe winters, in small flocks in the woods about Quebec. In the winter of 1890 I obtained six individuals which had been killed at Chateau-Richer, and since then I have seen but two others, some years

later; doubtless it should be found in our woods at that season (Dionne).

On February 22, 1920, I first observed this species near Quebec, when I saw two flocks, one containing five individuals, the other about one hundred and twenty. Other flocks, containing usually about forty birds each, were seen on several occasions from that date until April 12, 1920. Several times they were observed within the city limits.

622.e. *Lanius ludovicianus migrans* Palmer. Migrant Shrike.

I have not yet observed it near Quebec; but it should, however, occur here (Dionne).

On May 2, 1920, I observed a pair of birds of this subspecies near Ste-Foy. They were carefully examined with binoculars from a distance of a few feet only, and were positively identified. On a few other occasions I have seen near Quebec, but at a greater distance from me, Shrikes which were probably of this subspecies, but as I was unable, under these conditions, to distinguish them with certainty from the Northern Shrike, which I have identified here several times, I did not record them.

626. *Vireosylva philadelphica* (Cass.). Philadelphia Vireo.

Mr. Dionne gave no record of the occurrence of this species nearer to Quebec than Tadousac, where it was observed by Dr. Dwight. In 1919 and 1920 I found it to be a not common breeding bird in the immediate vicinity of Quebec.

629. *Lanivireo solitarius solitarius* (Wils.). Blueheaded Vireo.

Up to the present time I have seen but four specimens of it, which I killed in the woods to the north of Quebec, one of them at Cap Tourmente near St-Joachim (Dionne).

In the vicinity of Quebec I have observed one individual of this species on each of the following dates: May 18, 1919; May 20, 1919; June 30, 1919; May 18, 1920.

636. *Mniotilta varia* (Linn.). Black and white Warbler.

It is hardly common in the vicinity of Quebec, although some are seen each year in spring and autumn (Dionne).

In 1919 and 1920 I found this Warbler to be a common migrant in spring and fall and an uncommon summer resident near Quebec.

645. *Vermivora rubricapilla rubricapilla* (Wils.). Nashville Warbler.

It is uncommon about Quebec; I have seen so far but two individuals, killed in July, 1878 (Dionne).

This species was found in 1919 and 1920 to be a regular, uncommon summer resident, locally tolerably common in the vicinity of Quebec.

647. *Vermivora peregrina* (Wils.). Tennessee Warbler.

I have seen it but once in the woods about Quebec, toward the end of May, 1886, and, in a flock of seven individuals, of which five were killed, there was but a single female (Dionne).

In 1919, I observed this species near Quebec from May 19 to July 5, and in 1920 from May 21 to July 17. In those years it was a not common or a tolerably common spring migrant and a rare summer resident. Probably it occurs in the fall also, but so far I have not recorded it here at that season.

650. *Dendroica tigrina* (Gmel.). Cape May Warbler.

I have not been able so far to obtain more than three specimens, two of which were killed near Quebec in 1878, and the other one much further north some years later (Dionne).

Mr. Dionne has since recorded this Warbler's unusual abundance near Quebec in the spring of 1912. ('The Auk,' Vol. XXIX, No. 4, p. 545, Oct., 1912.)

In 1919 I observed at least five different males of this species, the first on May 22, the last on June 1. In 1920, I observed seven males of the species, the first on May 19, the last on May 30. All of these records were obtained near Quebec. I have no records of females and no fall records.

655. *Dendroica coronata* (Linn.). Myrtle Warbler.

This species, which travels in small flocks during its migrations, arrives here very early in the spring, and afterward disappears, to go further north to nest (Dionne).

In 1919 and 1920 a few of this species remained near Quebec during the entire summer each year, and probably nested there.

660. *Dendroica castanea* (Wils.). Bay-breasted Warbler.

It is rare about Quebec; up to the present I have seen but five specimens (Dionne).

The following summary contains my observations of this species in the immediate vicinity of Quebec in 1919 and 1920: May 24, 1919 (one); May 26 (one); June 1 (one); June 3 (one); August 23 (two); May 23, 1920 (one); May 24 (one); May 28 (one); May 29 (two); May 30 (two); May 31 (one); July 1 (two); July 12 (one); September 15 (one).

661. *Dendroica striata* (Forst.). Black-poll Warbler.

I killed five, one day in autumn, about fifteen years ago, and I have seen some on some occasions since, but very rarely (Dionne).

In 1919, I observed this species near Quebec on five different days, first on May 30 and last on June 6, the total number of individuals noted being

not less than six. In 1920, I observed it in the same region in spring on seven different days, first on May 27 and last on June 4. It was then tolerably common for a time, eleven individuals being recorded on June 3. The only fall records which I have for this warbler at Quebec are: September 9, 1920 (two); September 11 (one); September 23 (two).

662. *Dendroica fusca* (Mull.). Blackburnian Warbler.

This beautiful warbler is not common in our woods about Quebec (Dionne).

This species was common in 1919 and tolerably common in 1920 as a summer resident in the vicinity of Quebec.

679. *Oporonis philadelphia* (Wils.). Mourning Warbler.

Occurs accidentally at Montreal and at Quebec (Dionne).

The Mourning Warbler was a not common summer resident near Quebec in 1919 and 1920. In the course of a three-mile walk on June 3, 1919, in the immediate vicinity of Quebec, I observed eight males of this species, and during a similar walk on June 13, 1919, I observed seven.

686. *Wilsonia canadensis* (Linn.). Canadian Warbler.

This species is usually uncommon (Dionne).

The Canadian Warbler was a common summer resident about Quebec in 1919 and was tolerably common in 1920.

721. *Troglodytes aedon aedon* (Vieill.). House Wren.

In the first part of July, 1880, I captured a female which had just made its nest in a hole in one of the corners of a small arbor in the garden of the Quebec Seminary, which is the only time that I have seen it here (Dionne).

As a summer resident about Quebec this bird was recorded by me as rare in 1919 and as uncommon in 1920. Probably "uncommon" would more cor-

rectly represent its status in 1919. Two or three pairs spend the summer on the cliffs bordering the St. Lawrence just below Merici Convent, and a number of other pairs are scattered through the suburban districts each summer.

751. *Poliophtila caerulea caerulea* (Linn.). Blue-gray Gnatcatcher.

This species was not included by Mr. Dionne in his book because, when that book was written, there was no record acceptable to him of its occurrence in the Province of Quebec. One stray individual was observed by me within the limits of Quebec City on May 18, 1920. (See 'The Auk,' Vol. XXXVII, No. 3, pp. 464-465, July, 1920.)

757. *Hylocichla aliciae aliciae* (Baird). Gray-cheeked Thrush.

Mr. Dionne does not speak of any occurrence of this Thrush near Quebec City.

The only positive identification of it here which I have obtained so far was made by me in Gomin Wood on May 21, 1920, when I watched a single individual for some time at close range with binoculars. I was able to see clearly its uniform olive upperparts and its gray lores, and to note the lack of obvious buffy on the sides of the throat and breast. The bird, although chased about a good deal by me, remained absolutely silent, whereas Olive-backed Thrushes, when they arrive at Quebec, where they are summer residents, freely utter their characteristic notes. I have twice visited in Nova Scotia the breeding haunts of *H. a. bicknelli*, which differs from this subspecies in size only, and have there seen undoubted specimens of the species and noted their peculiarities of coloration, and I am well acquainted with the Olive-backed Thrush in the field.

On two or three other occasions in late May I have seen near Quebec solitary Thrushes which were probably Gray-checked Thrushes, but which I was unable to approach and see well enough to make satisfactory identifications.



THE FERNS OF HATLEY, STANSTEAD COUNTY, QUEBEC, 1920.

By H. MOUSLEY.

In my second paper on the orchids of Hatley, "THE CANADIAN FIELD-NATURALIST," Vol. XXXIV, 1920, No. 3, p. 44, I intimated that probably about forty species and varieties of ferns had been collected here in 1919, and that these would be dealt with in a separate paper. This it had been my intention to do early this year, but from one cause or another the matter has had to be postponed. This delay, which at first appeared vexatious, has really been beneficial, as it has given me another season in which to further prosecute my studies and at the same time add some new species to the list. For the benefit of those interested in ferns only, and who may not have read any of my previous papers on the birds, orchids and butterflies of the district, it seems almost necessary to again say a few words on the nature of the country surrounding Hatley. The village itself lies at an elevation of about 1,000 feet above the sea level, being backed on its eastern side by a ridge of hills rising some three hundred feet higher. The ground on the western side eventually slopes away until it reaches the level of Lake Massawippe (about 530 feet) a fine sheet of water nine miles in length, with an average breadth of about one mile. On its western shore, another ridge of hills known as the Massawippi Hills rises some 900 feet above the level of the lake. The country all round is well wooded, and there are numerous small streams most of which eventually find their way into the lake. In the deciduous woods, the prevailing trees are maple, birch, ash, elm, beech, cherry, butternut and poplar, whilst the coniferous ones consist of spruce, fir, hemlock, pine, tamarack and cedars. The geological strata for the most part consists of a fine-grained sedimentary rock, containing pyrite in some cases, whilst slightly calcareous in others, with veins of quartz appearing here and there, as well as granite. As in common with the rest of the Eastern Townships, the soils have been almost entirely formed during the glacial period, which is the most recent outstanding geological event in the history of this district. Any soils which previously existed, were apparently largely carried away by the movement of the ice, and even the solid rock was deeply eroded. On the retreat of the glacier, there was left a blanket of unconsolidated materials, composed of a heterogeneous mixture derived from both far and near, and including probably a small proportion only of old soils, together with a much larger proportion of rock, fragments ranging in size from a flour to huge boulders of a ton weight. Following the retreat of the glacier, this blanket has, until the present day, been subjected to the ordinary physiographic pro-

cesses of weathering and transportation by frost, streams, etc., resulting in a decomposition of the materials, and a tendency for the smaller particles to be continually moved downhill, and deposited as alluvium, etc. While the area south-east of the Massawippi valley is underlain by somewhat calcareous slates slightly metamorphosed, and the area to the north-west by highly metamorphosed volcanics and sediments, these rocks, as indicated above, have had a general rather than a detailed influence on the composition of the overlying soil.

As with the butterflies and orchids, most of my collecting has been done on the western side of the village, although there are some famous localities on the eastern side, one of which contains the only known station for Braun's Holly Fern, *Polystichum Braunii*. On this side lies also Barnston Pinnacle, a rocky bluff rising almost sheer out of Baldwin's Pond for a height of 600 feet. Mount Orford (2,860 feet) to the north is another rocky locality, but both of these places are some distance from my home and have only been visited once some years ago, when ferns were not being taken into consideration. Some of the smaller *Aspleniums* I think ought certainly to be found in these two localities, and perhaps the Male Fern, *Thelypteris Filix-mas*. Burrough's Falls to the south, and the gorge through which the river runs at Coaticook on the east, and the shores of Lake Massawippi in places are also rocky, but even these it has been found quite impossible to so far work properly, which may account for the scarcity in my list of purely rock-loving ferns. Of the other species enumerated most of them occur in more or less profusion, but there are some that seem to call for special attention, and these I propose to deal with in the order in which they appear in the list, which is that of Gray's Manual, seventh edition, the nomenclature of which, however, has been altered in accordance with the more advanced ideas, as set forth in Mr. C. A. Weatherby's paper, "Changes in the Nomenclature of the Gray's Manual Ferns," "Rhodora," Vol. XXI, 1919, No. 250, pp. 173-179. Most botanists, I believe, are in agreement with these changes although some will not admit the priority of *Thelypteris* for the Shield Ferns, and still use the name *Dryopteris* for this family. However, as Mr. Weatherby says on page 174, "*Thelypteris* remains the earliest valid name for *Aspidium* of the Manual, and much as one regrets adding another to the numerous names this genus has already borne, it must be taken up. Rules are of no use unless conscientiously followed." It seems

to me that Mr. Weatherby is right in what he says for if ever this bugbear nomenclature is to be laid by the heels, not only in this, but in all the other sciences, personal opinions will have to be made subservient, and rules strictly adhered to. For this reason I have followed the new order of things to the letter, as laid down in Mr. Weatherby's paper.

COMMON POLYPODY, *Polypodium vulgare* L. This fern so far does not appear to be the common one it usually is in most places. Certainly several stations for it have been found, but in none of them can it be said to be anything like abundant, nor have any of its numerous varieties been noted.

NARROW-LEAVED SPLEENWORT, *Athyrium angustifolium* (Michx.) Milde. Only one station for this smooth and delicately leaved fern has been found so far. This is in the centre of a large wood which has been partially cleared, and here in somewhat of a gully which is usually wet, is *angustifolium* found in some profusion, its principal companion being the Ostrich Fern, *Pteris nodulosa*.

CHRISTMAS FERN, *Polystichum acrostichoides* var. *Scheinitzii* (Beck) Small. In one corner of the above wood that harbours *A. angustifolium*, this variety of the Christmas Fern can be found in almost if not greater abundance than the type, the sori appearing in some cases on the tips of every pinnæ, which are toothed, and the fronds usually larger than in typical plants; no doubt due to the cutting down of the trees in this particular part of the wood, which allows the sunlight to act as a strong stimulus, thus producing plants of extra luxuriance; see "How Ferns Grow," Slosson, 1906, pp. 88-89.

BRAUN'S HOLLY FERN, *Polystichum Braunii* (Spencer) Fee. This handsome and uncommon fern with its long chaffy stalks has only been found in one locality known as the Gulf on the east side of the village. Here during the present season I counted over thirty plants. The time is probably not far distant when misfortune may overtake this species in the shape of being ushered into a new genus, when it will be known as *Actopteron Braunii* (Spencer) comb. nov. See "American Fern Journal," Vol. X, 1920, pp. 88-89. Will finality in nomenclatural matters be ever reached?

BROAD BEECH FERN, *Thelypteris hexagonoptera* (Michx.), n. comb. The Broad Beech Fern is apparently rare here, as I have only come across a very few examples so far, and these mostly small ones. With regard to the difficulty sometimes experienced in determining this species from the Long Beech Fern, *Thelypteris Phegopteris*, I would here like to draw attention to an article by Mr. C. A. Weatherby entitled, "A Neglected Character in the Beech Ferns," which appeared in the "American Fern Journal," Vol. IX, 1919, No. 4, pp. 121-122, in which the author points out how the difference

in the shape, size and coloring of the scales, which in both species are borne along the main mid-rib on the under side of the fronds, forms an almost certain index to the species. I have found this hitherto neglected character most useful in determining my specimens. Another character in the Beech Ferns is described by Mr. E. H. Clarkson in "The American Fern Journal," Vol. X, 1920, No. 2, p. 60. Here it is pointed out that when the fronds of the Long Beech Fern die down in the autumn the coiled tops of the next year's croziers may be seen protruding a little above the ground. This is never the case with the Broad Beech Fern whose croziers do not appear in the fall nor yet in very early spring. Fine fresh green fronds of it, however, can be found in September when *Phegopteris* is of a dull olive colour and no new fronds whatever are to be seen. In this country one can hardly walk in some of the woods without treading the Beech and Oak Fern, *Thelypteris Dryopteris*, under foot, and yet if I remember rightly neither of them are common in England, at all events I can only call to mind having once seen them at Bolton Abbey, in Yorkshire, and there only in one particular wood. The order in which the Beech Ferns appear in my list is different to that of the Manual, and has been made necessary by the new classification as set forth in Mr. Weatherby's paper. See page 176.

THE MARGINAL SHIELD FERN, *Thelypteris marginalis* (L.) Nieuwl. This is a well distributed fern but more abundant in some localities than others. Probably the Gulf already referred to is the best station for it, and here I have found a few examples of the var. *elegans*, J. Robinson, a handsome form with larger fronds and lobed or toothed pinnules.

GOLDIE'S FERN, *Thelypteris Goldiana* (Hook) Nieuwl. l.c. This large and very handsome species is what may be termed one of the rarer or more exclusive ferns, and I only know of two stations for it, one in the Gulf, and the other in the same wood where *A. angustifolium* is found. Only a very few plants occur at either place.

BOOT'S SHIELD FERN, *Thelypteris Bootii* (Tuckerm.) Nieuwl. Hardly sufficient time has yet been given to this species to express any very decided opinion, as to its rarity or otherwise. I am inclined to think, however, that it is fairly well distributed.

CLINTON'S WOOD FERN, *Thelypteris cristata* var. *Clintoniana* (D. C. Eaton), n. comb. The same remark applies equally well to this species as to Goldie's Fern, both being found in the same localities and in about equal limited numbers.

SPREADING WOOD FERN, *Thelypteris spinulosa* var. *americana* (Fisch.), n. comb. This form of the Spinulose Wood Fern appears to be by no means rare, and can be found, I think, in most of the large woods. The type and various varieties, however,

such as *Boottii*, *intermedium* and *americana* (the latter formerly known as *dilatatum*) are by no means always easy to determine, and more time will have to be spent on them before any very definite opinion can be expressed as to their distribution.

BULBLET BLADDER FERN, *Cystopteris bulbifera* (L.) Bernh. It seems strange to have to speak of a fern as a nuisance, but that is what this species really is at times. It abounds everywhere not only on the rocks, but in the woods as well. I remember once visiting Burrough's Falls in the hope of finding some of the smaller rock ferns. I soon gave up the search as the rocks were simply smothered with this species, and it would have been impossible to detect any of the small Aspleniums with such a blanket over them. The Fragile Bladder Fern, *Cystopteris fragilis*, is not nearly so abundant and can really be said to be rare in comparison with the Bulblet.

SMOOTH WOODSIA, *Woodsia glabella*, R. Br. This rare and delicate little fern I look upon as one of my best finds. The only locality for it is situated on the eastern shore of Lake Massawippi, between the railway station of that name and Perkin's Point. I first found it on May 24 of this year (1920) almost at the foot of a rocky railway slope and I am pleased to say there was quite a little colony of it, all the plants I examined being heavily fruited.

OSTRICH FERN, *Pteretis nodulosa* (Michx.) Nieuwl. Of the large ferns this in my opinion is the handsomest, although the great *Osmundas* run it very close. The reason for its masquerading under the names *Pteretis nodulosa* and not *Onoclea Struthiopteris* as heretofore, will be found fully explained in Mr. Weatherby's paper already referred to.

ROYAL FERN, *Osmunda regalis* L., var. *spectabilis* (Willd.) Gray. Seeing that the American Royal Fern differs from the European in the shape of its pinnules it has been thought desirable to make it a geographic variety, hence the var. *spectabilis*, see Weatherby as above.

CINNAMON FERN, *Osmunda cinnamomea* L. Possibly of the three *Osmundas* this is the most widely distributed. On August 22, 1919, I came across a peculiar frond growing apparently from a root of *Osmunda Claytoniana*, which I gathered and pressed, there being only this one example. From the disposition of the pinnules I took it to be var. *dubia* Grout. On September 7, 1920, however, I came across another similar frond very near the same spot, which clearly belonged to *O. cinnamomea*. This caused me to more carefully examine the previous frond at the base of some of whose pinnæ, by means of a magnifying glass, I found the little woolly tufts, thereby clearly establishing its identity as *cinnamomea*. I also found where I had gathered it the year previous that there was a root of

cinnamomea and *Claytoniana* growing almost interlocked, and as there were several fronds of the latter and only this one of the former I had taken it as belonging to *Claytoniana*. The pinnæ of these fronds are placed far apart on the rachis the upper ones being from 2.5 to 3.5 cm., and the lower ones 4 cm. apart. The pinnules which are somewhat toothed or lobed are also from 5 to 10 mm. apart which gives the whole frond a very light and open appearance. As far as I can gather there is no name for this variety, or may it be a cross between these two *Osmundas*?

ADDER'S TONGUE FERN, *Ophioglossum vulgatum* L. As it is proposed to make the family Ophioglossaceae the subject of a further paper, at some future time, I only propose in the present instance to deal very briefly with each species. The present one I find in the damp hollows of almost every mowing field, as well as on the dry knolls of some of the upland pastures. In the latter situations, environment plays an important part in the growth of the species, many of the plants only attaining a height of from 3 to 9 cm., whereas those growing in the damper situations run from 20 to 33 cm.

MOONWORT, *Botrychium Lunaria* (L.) Sw. This rare little fern was only discovered in June of the present year (1920) in two localities, in one of which only one plant was found, and about half a dozen in the other. These latter seem referable to the form known as *onondagense* Underw.

MATRICARY GRAPE FERN, *Botrychium ramosum* (Roth.) Aschers. In 1919 this species was particularly abundant in one station on sloping ground under cedars, but this year comparatively few plants could be found, although at another new station, also on sloping ground, but under deciduous trees, quite a number could have been gathered.

COMMON GRAPE FERN, *Botrychium obliquum* Mulh. This species and the var. *dissectum* Spreng. I had the gratification of adding to the list of Quebec ferns on December 21, 1918, as recorded in "THE CANADIAN FIELD-NATURALIST," Vol. XXXIII, 1919, No. 5, p. 97. At that time only one example of each was found, and nothing was known of their distribution. Now, however, I am able to state that both are abundantly distributed, *obliquum* being much the commoner of the two.

TERNATE GRAPE FERN, *Botrychium ternatum* (Thunb.) Sw., var. *intermedium* D. C. Eaton. This is another well distributed species, but not nearly so plentiful as *obliquum*.

RATTLESNAKE FERN, *Botrychium virginianum* (L.) Sw. There is hardly a wood in which this species is not more or less abundant, the plants ranging in height from 8 to 60 cm.

It may here be of interest to mention, that of the forty-one species and varieties enumerated, all have

been gathered within an area of four square miles, which area could still further be reduced to three square miles if we except *Woodsia glabella*. In the United States a friendly rivalry exists as to which State holds the record for the best fern localities. At present the State of Vermont which adjoins our County of Stanstead claims premier honors (the same as it does for the orchids,) having three localities, Willoughby Lake, Dorset and Manchester where thirty-five, and Pittsford, where thirty-four true species of ferns have been collected. In view of this it has recently been said that apparently only Vermont can compete effectively with Vermont, a statement which I hope ere long to refute, seeing that my list of true ferns for Hatley now stands at twenty-eight species, and this for only two years work, whereas most, if not all, of the above lists have been in the making for over twenty years. It seems strange in view of Gosse's diversified love of natural history subjects, he should have entirely ignored the ferns, for we find no mention whatever of them in his "*The Canadian Naturalist*," 1840, written whilst residing in these parts from 1835-38.

In conclusion, my best thanks are due to Mr. William R. Maxon, who after the death of Mr. James M. Macoun, kindly undertook to verify my determinations, and who in many other ways has given me much valuable help and assistance which has greatly facilitated the writing of this paper. To Dr. Harvie I am indebted for the information regarding the geological formation of this district, and for naming samples of rock submitted.

LIST OF THE FERNS OF HATLEY, 1920.

POLYPODIACEÆ.

- Polypodium vulgare* L. Common Polypody.
Adiantum pedatum L. Maidenhair.
Pteridium latiusculum (Desv.) Maxon. Common Brake, Bracken.
Athyrium angustifolium (Michx.) Milde. Narrow-leaved Spleenwort.
Athyrium acrostichoides (Sw.) Diels. Silvery Spleenwort.
Athyrium angustum (Willd.) Presl. Lady Fern.
Polystichum acrostichoides (Michx.) Schott. Christmas Fern.
Polystichum acrostichoides var. *Scheinitzii* (Beck) Small (var. *incisum* Gray).
Polystichum Braunii (Spencer) Fee. Braun's Holly Fern.
Thelypteris palustris Schott. Marsh Fern.
Thelypteris noveboracensis (L.) Nieuwl. l.c. New York Fern.
Thelypteris Phegopteris (L.) Slosson. Long Beech Fern.

Thelypteris hexagonoptera (Michx.), n. comb. Broad Beech Fern.

Thelypteris Dryopteris (L.) Slosson. Oak Fern.

Thelypteris marginalis (L.) Nieuwl. l.c. Marginal Shield Fern.

Thelypteris marginalis var. *elegans* J. Robinson.

Thelypteris Goldiana (Hook.) Nieuwl. l.c. Goldie's Fern.

Thelypteris Bootii (Tuckerm.) Nieuwl. Boot's Shield Fern.

Thelypteris cristata (L.) Nieuwl. l.c. Crested Shield Fern.

Thelypteris cristata, var. *Clintoniana* (D. C. Eaton), n. comb. Clinton's Wood Fern.

Thelypteris spinulosa, var. *intermedia* (Muhl.), n. comb. Spirulose Wood Fern.

Thelypteris spinulosa, var. *americana* (Fisch.), n. comb. Spreading Wood Fern.

Cystopteris bulbifera (L.) Bernh. Bulblet Bladder Fern.

Cystopteris fragilis (L.) Bernh. Fragile Bladder Fern.

Woodsia glabella R. Br. Smooth Woodsia.

Dennstaedtia punctilobula (Michx.) Moore. Hay-scented Fern.

Onoclea sensibilis L. Sensitive Fern.

Onoclea sensibilis var. *obtusilobata* (Schkuhr.) Torr.

Pteritis nodulosa (Michx.) Nieuwl. Ostrich Fern.

OSMUNDACEÆ.

Osmunda regalis L., var. *spectabilis* (Willd.) Gray. Royal Fern.

Osmunda Claytoniana L. Interrupted Fern.

Osmunda cinnamomea L. Cinnamon Fern.

OPHIOGLOSSACEÆ.

Ophioglossum vulgatum L. Adder's tongue.

Botrychium Lunaria (L.) Sw. Moonwort.

Botrychium ramosum (Roth.) Aschers. Matricary Grape Fern.

Botrychium obliquum Muhl. Common Grape Fern.

Botrychium obliquum var. *elongatum* Gilbert & Haberer.

Botrychium obliquum var. *dissectum* (Spreng) Clute. Feathery Grape Fern.

Botrychium obliquum var. *oncidense* (Gilbert) Waters.

Botrychium ternatum (Thunb.) Sw., var. *intermedium* D. C. Eaton. Ternate Grape Fern.

Botrychium virginianum (L.) Sw. Rattlesnake Fern.





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THE VERTEBRATES OF THE OTTER LAKE REGION, DORSET, ONTARIO.

BY A. H. WRIGHT AND S. E. R. SIMPSON.

I.—GENERAL ACCOUNT.

BY A. H. WRIGHT.

The district covered by these notes might well be termed the Lake of Bays region. More strictly they pertain to the extreme eastern part of Muskoka from the longitude of Portage (between Peninsula Lake and Lake of Bays) to that of Hollow lake (Lake Kawagama, or Kahweambelewgamat or Kahweamhegewagamag) in northwestern Haliburton. In latitude they relate of the region from Dorset on Trading lake (the eastern end of Lake of Bays navigation) northward to Algonquin Park Station in southwestern Nipissing. The center of activity is at Camp Otter (Professor C. V. P. Young, Cornell '99, Director) on Otter lake which is two miles north of Dorset. The waters and woodlands of the above roughly outlined district are more or less traversed each summer by councillors of this camp.

Camp Otter is now in its eleventh season. From its beginning Prof. and Mrs. C. V. P. Young, its directors, have been interested in various phases of animal and plant life. Early associated with them were Dr. and Mrs. S. A. Munford and later Dr. and Mrs. Abram T. Kerr, of Ithaca, N.Y. Besides those who have encouraged the study of natural history in this region, have been several students or associates of the senior author. Some of these resident naturalists have been Prof. Asa C. Chandler, Mr. Frank M. Kilburn, Prof. E. L. Palmer, Mr. G. M. O'Connell (several seasons), Dr. H. G. Bull, Mr. D. C. Gamble and Mr. S. E. R. Simpson. We have added some observations of Mrs. Julia Moesel Haber (Prof. of Zoology in Elmira College, Elmira, N.Y.) for Fox Point (1911). Several summers Mr. L. A. Fuytes, the bird artist, has spent varying periods in the camp.

These lists are presented with the idea of starting a permanent catalogue of animal and plant forms of the region.

Otter Lake is distinctly in the Canadian life zone. The coniferous evergreens are: larch, black spruce, balsam fir, arbor vitae, hemlock, white and

red pines, and common juniper (*Juniperus communis*). Back of camp in the deeper woods or undisturbed areas occur plenty of yellow and paper birches, sugar maples, mountain ash with undergrowth of mountain and striped maples, hobblebush, beaked hazel nut and hoary alder (*A. incana*). In the more open places are quaking aspen, large toothed poplar and some balsam poplar.

Along the road southward to Dorset and Lake of Bays where sparse settlement begins, occur a few basswood, American elm, white ash, black birch, staghorn sumac, scarlet oak, choke cherry, alternate-leaved dogwood, thorn apple (*Crataegus* sp.), and (*Diervilla lonicera*), unmistakable signs of the Transition Zone. No black walnuts, butternuts, nor hickories were recorded. On Rock Island of Otter lake and along some roads occur red oak, wild red cherry, june berry, Bebb's willow.

Along the road to Hardwood lake and at Hardwood lake a similar element we have, in some beeches among many maples and birches, plenty of wild black and red cherries, staghorn sumac, black elders, alternate-leaved dogwood and white ash.

Around or in peat bogs occur: leather leaf, bog rosemary, withe rod (*Viburnum cassinoides*), blueberries (*Vaccinium pennsylvanicum*, *V. p. nigrum*, *V. canadense*), black alder (*Ilex verticillata*), skunk currant (*Ribes prostratum*) and mountain holly (*Nemopanthis mucronata*) the last being rare.

Around some of the lakes or in swampy edges were found sweet gale (*Myrica Gale*) red berried elder, glaucous willow, shining willow, meadow sweet and black ash.

Other trees and shrubs which proved uncommon about camp were red-osier dogwood, sheep laurel (*Kalmia angustifolia*), American fly honeysuckle, hop hornbean (*Ostrya virginiana*).

The herbaceous flora reveals a strong Canadian cast. Around the camp site are twin-flower (*Linnaea borealis*), dwarf cornel (*C. canadensis*), common wood sorrel (*Oxalis acetosella*), pale corydalis (*Corydalis sempervirens*), bristly sarsaparilla,

(*Aralia hispida*), enchanter's nightshade (*Circaea alpina*), yellow Clintonia (*Clintonia borealis*), painted trillium (*Trillium undulatum*), large coral root (*Corallorhiza maculata*), shin-leafs (*Pyrola elliptica*, *P. cholorantha*, *P. minor*), false-lily of valley, (*Maianthemum canadense*) and twisted stalk (*Streptopus*).

In and around the peat bog were (*Cypripedium acaule*) both normal pink, and albino yellow-petalled specimens, small greenwood orchis (*Habenaria clavellata*), small northern bog orchis (*H. obtusata*), rattlesnake plantain (*Epipactis pubescens*), nodding ladies' tresses (*Spiranthes cernua*), multitudes of grass pink (*Calopogon pulchellus*) and rose pogonia (*Pogonia ophioglossoides*), gold-thread (*Coptis trifolia*), creeping snow-berry (*Chio-genesis hispidula*), dwarf raspberry (*Rubus triflorus*), Dalibarda (*D. repens*), both cranberries, three-leaved Solomon's seal (*Smilacina trifolia*), arbutus (*E. repens*), masses of horned bladderwort (*Utricularia cornuta*), lance-leaved violet (*Viola lanceolata*), naked bishop's cap (*Mitella nuda*), Indian cucumber-root (*Medeola virginiana*) and *Aster junceus*, spatulate and round-leaved sundews (*Drosera intermedia* and *D. rotundifolia*), and Canadian and marsh St. John's wort (*Hypericum canadense*, *Triadenum virginicum*).

On the more open hillside opposite camp and toward Dorset were narrow-leaved gentians (*Gentiana linearis*) and the northern bed straw (*Galium boreale*).

The mammals are decidedly of Canadian affinity, but with the rare appearance of wildcat, raccoon, black squirrel, transition zone influences enter.

In the birds more transitional forms appear rarely or sparingly, toward Dorset, southward and westward to wit: towhee, woodthrush, yellow-throated vireo, Baltimore oriole, catbird, whippoorwill, least flycatcher, indigobird, yellow warbler, parula warbler, red-headed woodpecker, Maryland yellow-throat.

Thus in trees, herbaceous under-cover, birds and mammals there is close agreement in the preponderance of Canadian forms. At Otter Lake and northward, the incursion of the transition element is not so pronounced as at Huntsville, where railroad and other civilized encroachments play a greater role. The ride from Huntsville to Dorset and thence by foot to Otter lake emphasizes this difference to the trained observer.

To such as might wish to know what ferns we casually observed the list is:

Woodsia Ilvensis

Osmunda Claytoniana

Onoclea sensibilis

Osmunda cinnamomea

Osmunda regalis

Dicksonia punctilobula

Polystichum acrostichoides

Aspidium noveboracense

Aspidium cristatum

Aspidium marginalis

Asplenium Filix-femina

Pteris aquilina

Polypodium vulgare

Phegopteris polypodioides

Phegopteris hexagonoptera

Phegopteris Dryopteris.

II.—THE FISH.

By A. H. WRIGHT.

The present list of sixteen species reveals the scanty variety of the Highlands of Ontario. Several of these are introduced species. Others are stock introduced to replenish the supply of the waning species in this series of lakes which are two hundred or more feet higher than the Muskoka group. The decided barriers do not permit incursions from the great variety of the Great Lakes. The region, however, abounds in individuals of the few game species it possesses. For comparison, we have employed Meek's¹ results in the Highlands of Ontario. He began at Hawkestone and Orillia on Lake Simcoe and followed the Grand Trunk railroad through Gravenhurst (Muskoka lakes) to Trout Creek and North Bay (Lake Nipissing). All the way northward the railroad bears away from Georgian bay and the stations he successively came to were successively farther away from it in barriers, etc. Lake Simcoe and the Muskoka lakes are much nearer Georgian bay and Lake Ontario than Lake of Bays or Otter lake. Hence the Great Lakes' complexion of Lake Simcoe with silversided minnow (*N. atherinoides*), log perch (*Percina caprodes zebra*), spot-tailed minnow (*Notropis hudsonius*), silvery minnow (*Hybognathus nuchalis*), trout-perch (*Percopsis omiscomaycus*) and long-nosed dace (*Rhinichthys cataractae*), or Moon river just below Muskoka lake (Bala) with log perch, spot-tail minnow and silvery minnow. Such species are never to be expected in Otter lake unless introduced or unless it was geologically connected with the Great Lakes. Otter Lake seems more comparable to Trout Creek. The former has sucker, horned dace, red-bellied dace, fathead, Cope's minnow, shiner, brook trout, pumpkin seed; the latter has suckers, horned dace, red-bellied dace, fathead, blunthead, shiner, brook trout, brook stickleback, nine-spined stickleback and pumpkin seed,

(1) Meek, S. E. Field Columbian Museum Zoological Series, Volume I., No. 17., Publ. 41. November, 1899, pp. 307-311 and Volume III., No. 7, Publ. 67, July, 1902, pp. 131-140.

and in the blunthead and nine-spined stickleback shows slightly greatly affinity to the Great Lakes than Otter Lake. Most previous lists for Ontario² although of some help related too much to the ichthyologist's boundary paradises and reservoirs, namely: Lakes Ontario, Erie, Huron and Superior, to be of particular service in the study of the far inland lakes of the province.

Ameiurus nebulosus (Le Sueur). Catfish.

Common in the weedy edges of Otter lake where pickerel-weed, pipe-wort, watershield and other water plants abound. Also found in outlet of the Peat bog. We found no catfish in Fletcher lake.

Catostomus commersonii (Lacepede). Sucker.

Reported as common throughout the region. I secured it at Otter lake. Meek secured it at Gravenhurst and Trout creek.

Chrosomus erythrogaster Rafinesque. Red-bellied Dace.

The most common minnow of all these lakes. It is especially a minnow of quiet clear water, both lakes and streams. Every lake or pond visited if it had minnows at all harbored mainly red-bellied dace. Meek secured it at Muskoka lake and Trout creek. Also taken by Professor Macoun in Algonquin Park.

Pimephales promelas Rafinesque. Fat-head.

On August 11, 1913, we seined several "fat-heads" in a marshy place of Otter lake. Meek secured it at Trout Creek.

Notropis cayuga Meek. Cayuga Minnow.

In weedy shallows of Otter lake and its peat bog pond we found this species. I believe this the same as Meek's *N. muskoka* taken by him at Gravenhurst and other places.

Notropis cornutus (Mitchill). Shiner.

The shiner or redbfin occurs in many of the lakes of the region. Taken by us in Otter, Harvey Jr., and other lakes.

Semotilus atromaculatus (Mitchill). Horned Dace. Creek Chub.

Widely distributed. It was found in Otter, Harvey Jr., Fletcher and other lakes. Meek had it from Gravenhurst and Trout Creek.

Leuciscus neogaeus (Cope). Cope's Minnow.

In weedy shallows of Otter Lake, we secured representatives of this form on July 29 and August 11, 1913, associated with red-bellied dace.

Esox lucius (Linnaeus). Pike.

So far as we could determine there are no native pike (*E. lucius*), pickerel (*E. tridecemlineatus*) and lunge (*E. masquinongy*) in Lake of Bays, Hollow Lake, Fletcher Lake and other lakes of this

region, and no one was found to report introduced fish of these three species. Meek reports the pike and lunge from Muskoka Lake.

Eupomotis gibbosus (Linnaeus). "Pumpkin Seed."

Common from Lake of Bays to Algonquin Park. The boys of camp brought us sunfish from Harvey Jr., Hardwood, Fletcher and other lakes and they were not uncommon in Otter Lake. Rock bass are not in these lakes but held by local fishermen to be in lower lakes although Meek stated there were no rock bass in the lakes of the Highlands of Ontario.

Micropterus dolomieu Lacepede. Small-mouthed Black Bass.

Not reported from Lake of Bays eastward or northward. Meek secured it on Muskoka Lake.

Perca flavescens (Mitchill). Perch.

Taken in several lakes in 1913. Common in Fletcher, Skin and Porridge lakes, but not very large. Held to be put in these lakes by the Dominion government twenty or more years before. The stock is supposed to have come from Orillia. Also taken in Lake of Bays. Meek secured them at Gravenhurst.

Cristivomer namaycush (Walbaum).

Common in many of the lakes of the region. Held by many residents to be native of Hollow, Kimball, Bear and some other lakes. In others like Hardwood they were held to be introduced about June, 1889. About Hollow Lake, Lake of Bays, and other lakes of the region they allude to larger gray trout with white flesh and smaller salmon trout with reddish flesh.

Salvelinus fontinalis (Mitchill.) "Speckled Trout." Brook Trout.

Common in lakes of the region. Taken in Otter, Fletcher and Harvey lakes and others more remote.

Coregonus clupeiformis (Mitchill). Whitefish.

We saw no whitefish. One informant said there was a whitefish caught in the shallows of Hollow lake during the fall and winter. Others state that there is a whitefish in Lake of Bays. Whether these are true whitefishes or ciscos remains to be discovered. Some of the rangers assert there are whitefish lower down at Orillia, Peterboro, etc., but not here.

Lota maculosa (LeSueur). Ling.

This species is reported as very common in Lake of Bays, and Hollow lake where they are caught on night lines.

III.—THE BATRACHIANS AND THE REPTILES.

BY A. H. WRIGHT AND S. E. R. SIMPSON.
THE SALAMANDERS.

Nash (1908) gives ten species of salamanders

(2) Nash, C. W., Checklist of the Fish of Ontario, Dept. of Education, Toronto, 1908. Also, "Fishes of Toronto" in "The Natural History of Toronto Region, Ontario, Canada, pp. 249-371.

for Ontario; Piersol (1913) seven for the Toronto region; and Patch (1918) six from Ottawa. Our list should include *Ambystoma maculatum*, *Eurycea bislineata*, *Notophthalmus v. viridescens*, *Ambystoma jeffersonianum*, and *Plethodon cinereus*. As yet we have recorded at Otter Lake or in its environs (within 10 miles) only the last three, the same species which Meek (1899, 1900) took in Gravenhurst or Trout Creek. Little effort has been made for their search except in the summer of 1913.

Notophthalmus v. viridescens (Rafinesque). Common Newt.

Two or three records of this form were made in the summer of 1913. It is, however, rare. Meek took one near Gravenhurst, September, 1899.

Ambystoma jeffersonianum (Green). Jefferson's Salamander.

Recorded only once in 1913 at Otter Lake. Meek and Clark (1900) secured two specimens from Trout Creek to the northward.

Plethodon cinereus (Green). Red-backed Salamander.

Rather uncommon about Otter Lake. Taken at three different times in 1913 by Messrs. C. V. P. Young and E. Bennett. All the material was of the red-backed phase. Inasmuch as these records were within the species' breeding season, all were found in rotting logs.

THE FROGS.

Bufo americanus Holbrook. American Toad.

Abundant. Between June 29-July 3, 1913, we found numerous transforming and transformed toads in the trails and roads. In August, 1919, they were found just transformed in some places. Most of the adults are much spotted below.

Hyla crucifer Wied. Spring Peeper.

Meek found this form common in September, 1899, near Gravenhurst but scarce in June 1900. It is solely a question of voice records. In 1913 lone peepers were heard from June 28-July 6. Throughout most of July they were quiet, except for a few at the very end of the month. By August 10, 1913, stray peepers began to call and from then onward into September they were not uncommonly heard. We recorded them at Lake of Bays, Gem, Hardwood, Crozier, Fletcher and Otter lakes. We took them in midsummer in the woods, in dried up swampy areas, and around the edges of the lakes.

Hyla v. versicolor Le Conte. Tree Toad.

Not commonly found during midsummer after the breeding seasons of late May-July. Heard in late June or early July (9th) in 1913. In 1919 heard occasionally throughout the summer. Some-

times in midsummer we find them amongst the moist leaves around the lakes or in swampy areas.

Rana catesbeiana Shaw. Bullfrog.

Meek found it abundant at Gravenhurst and Bala and so it is at Otter Lake. The boys of this camp frequently catch them for food. By day they often club them with a paddle or with a stick, catch them by hand or with red flannel and hook. In the last of June and early July the bullfrog chorus is quite pronounced. After the middle of July, or July 20th, a few males are heard at night. Egg laying may rarely extend to August 1, some females taken on July 25, 1913, being unspent.

Rana clamitans Latreille. Green Frog.

Meek found it very abundant at Gravenhurst and at Bala. Very common in the Otter lake region. This species normally transforms in June and July but in August 25, 1919, newly transformed specimens were found.

Rana palustris Le Conte.

Scarce. In the summer of 1913 all of our records of this species came between July 14 and 25. Then only isolated specimens were discovered.

Rana pipiens (Schreber.) Leopard Frog.

The most abundant frog of the region.

Rana septentrionalis Baird. Mink Frog.

Not uncommon in the Otter lake region. They were heard croaking from July 7-16, 1913, in a small peaty lake near Otter lake. Later on July 24, 1913 (in Ten Mile creek) between Lake of Bays and Otter lake we found them common among lily pads, also at Porridge lake, July 28, 1913 and on Fletcher lake, September 1, 1913. In 1919 in the middle and last of August sixty or more were taken with a net from the lily pads.

Rana sylvatica Le Conte. Wood Frog.

In 1913, we secured only two newly transformed specimens on July 8 and July 24, and three adults, July 25. All were lost and we are unable to identify them positively as *R. sylvatica*. It is a woodland form in midsummer, very seldom seen.

THE SNAKES.

Nash gives 17 species of snakes for Ontario. J. B. Williams finds 9 species in the Toronto region, Meek, 3 species in Muskoka country and Patch, 2 species in the vicinity of Ottawa. We have five species in our list. Three more may be later reported by subsequent writers. We found no clue to the riband snake at all. The natives described two other snakes, one apparently the milk snake (*Lampropeltis triangulum triangulum*) and another the spreading adder (*Heterodon contortrix*) from the region somewhat south of Lake of Bays.

Diadophis punctatus (Linné.) Ring-necked snake.

In the summer of 1913 we recorded six specimens of this species, mainly along the road to Dorset and on the cliff to the west of camp. In 1919 one was found in mid-August between Otter lake and Dorset.

Liopeltis vernalis (Harlan.) Green Snake.

Meek secured one at Gravenhurst and G. S. Miller, Jr., Aug. 6, 1896, saw a green snake at this same place. Several of the natives voluntarily described a "grass green snake not very common." We have not yet taken it.

Natrix sipedon sipedon (Linné.) Water Snake.

Meek took one specimen at Gravenhurst and the species is uncommon in the Lake of the Bays region. Many of the natives call it a "black snake." *Storeria occipito-maculata* (Storer.) Red-bellied Snake.

This and the ring-necked snake are of about equal occurrence in the region. Through 1913 and in August, 1919 we recorded four specimens

of this species.

Thamnophis sirtalis sirtalis (Linné.) Garter Snake.

Abundant; the snake of the region. On August 11, 1913 one of our captive garters gave birth to 19 young.

THE TURTLES.

Chelydra serpentina (Linné.) Snapping Turtle.

Uncommon. Found more in muddy creeks and ponds than in the open lake. We took one July 23, 1913, in Fletcher lake with a carapace length of 18-20 inches. On the road to Dorset in the last of August, 1919, another specimen was taken with head width of three inches. Sometimes called "Black-turtle" in this region.

Chrysemys marginata marginata (Agassiz.) Western Painted Turtle.

We have not seen this form in this region but the natives describe a small mud turtle other than the snapper and the description accords well with this species.

(To be continued.)

THE LARGER FRESHWATER-CRUSTACEA FROM CANADA AND ALASKA.

BY FRITS JOHANSEN.

(Continued from Vol. XXXIV, page 132)

II.—ISOPODA.

This order of crustacea has a great number of representatives in the sea, some of which live parasitically on fishes, other crustacea, etc., and are correspondingly deformed, especially the females. Three families are known from freshwater on this continent.

They have the following characters in common with the amphipods; a many segmented body, no carapace, but the head and first thoracic segment united, and the eyes, when present, sessile. While the body of an amphipod is compressed that of an isopod is depressed thus making the latter a less capable swimmer, but admirably suited for dodging under stones, etc., and attaching itself to moving animals. It is true that certain of the marine forms (*Mesidothea* sp.) are good swimmers (using their legs), and live almost a pelagic life when they are very young (just after leaving the brood-pouch), but they soon change this for crawling over or burrowing in the sea bottom, the typical life for most of the isopods. The eggs are carried by the females on the underside of the body in a brood-pouch,*

as in the amphipods, and the young ones also remain inside the pouch some time after hatching. The newborn young are practically like their parents though different in color and the proportional size of the various parts of the body, and the embryonal development inside the egg is said to be not quite so complete as with the amphipods. A popular name for the isopods is "sow-bugs," and it is well known that certain of them (*Oniscus*, etc.) live on land under bark or stones, etc. The marine and terrestrial forms are predacious, while those in freshwater feed upon decaying vegetable matter. Owing to their more hidden habit the freshwater forms are not quite so important an item in the food of fishes, birds, etc., though the marine or brackish water forms are decidedly so. Among the latter is the large interesting species *Mesidothea entomon*, which has a circumpolar distribution and also is found as a glacial marine relict in the large lakes of Sweden and in the Baltic. In the arctic it is a littoral form and one of the most characteristic and commonest invertebrates along the coast west of Hudson Bay. I have observed (arctic Alaska) how it will enter the estuaries of rivers or smaller water courses at high tide, remain there in quiet

*Formed by lamellae from the thoracic legs.

pools† and gradually ascend the streams so that it is even found in certain large freshwater lakes near the coast and serves as food for typical freshwater-fishes (lake-trout, etc.). It has not, however, in the arctic becomes a freshwater species to the same extent as has other crustacea, *Mysis relicta* Lovén (see Rep. Canad., Arct. Exped., 1913-18, Vol. VII, Parts B. and D.).

Of the three families of freshwater isopods occurring on this continent the one (Cirolanidae) is represented by a blind form in artesian wells and has so far only been found in the United States, and the other is that of the parasitic Bopyridae found upon higher crustacea (Decapoda). Nor has this latter yet been recorded from Canada or Alaska; the females in the genus *Probopyrus* become, after attachment to their host, peculiarly deformed and unsymmetrical while the young individuals and males are more normal in habit and appearance. There is a great number of marine forms of this family. The third family of freshwater-isopods is the Asellidae, which is represented by three genera of which one has so far only been recorded from the United States, and as with the species of the two preceding families is apparently missing from Canada and Alaska. It is found in underground caves or artesian wells. The Asellidae are distinguished from the Cirolanidae by the fact that the last pair of tail feet (uropods) are not inserted laterally on the telson so as to form a tail-fan, but at the posterior end. As mentioned above the family is represented in Canada by two genera. The first (*Mancasellus*) of these has only one species *M. tenax* Smith, in Canada and probably does not occur in Alaska. It is easily separated (see Huntsman's figures) from the one species of the other genus *Asellus communis* Say also occurring in Canada by the extended, truncate epimera (segmental processes) and by the head being much broader than long and with a deep incision on each side, characters which can be ascertained even in very young individuals. It has thus a much greater transverse diameter than has *Asellus communis* and is superficially not unlike its terrestrial relatives though lacking the latter's ability to roll itself up into a ball. It is far less abundant than *Asellus*, and seems to be still more retiring with mode of life, being mainly found under stones, etc., nor is it found in temporary pools and streams where the other is often found. Its distribution in Canada seems to be somewhat like that of *Eucrangonyx gracilis*, and limited to the Great Lakes area (Superior, Huron, Georgian Bay, Lake Ontario, upper St. Lawrence river, the Ottawa valley and southern Ontario); in the United States it has been recorded

from Lake Superior to the Detroit river. Its maximum length is not quite 1½ cm. About its life-history little has been known, but I am able to give some interesting data recently acquired. Thus among the specimens sent me by Prof. E. M. Walker of Toronto and collected near Lake Simcoe, Ont., on May 30, 1917, some of the females had eggs in the brood-pouch. I secured a great number of very young (3-4 mm. long) individuals of this species under stones in a bight of the Ottawa river on July 6, 1919.

The same day I found young *Asellus communis* of a corresponding size, and could thus compare them. The young *Mancasellus* could be distinguished from the young *Asellus* not only by the characters given above (greater width, lateral incision in head, etc.), but also by a very characteristic pattern of four dark brown, longitudinal stripes upon their dorsal side quite lacking on the paler young of *Asellus*. There was some variation among the different young *Mancasellus* in the intensity and distribution of the longitudinal, dorsal stripes, but the pattern was always the same, and I found it to hold good also for the young (below 5 mm.) *Mancasellus* which I secured at Alexandria Bay, N.Y., on September 1, 1919 (see below). The full-grown *Mancasellus* I collected, also, show some traces of this pattern (the animals were dusky dorsally), so it seems to be a characteristic of the young individuals. It was interesting to note, that the average size of the young *Mancasellus* collected on July 6th was larger (3-4 mm.), than that of the young *Asellus* (3 mm.) on the same date; the broods of *Mancasellus* are probably born somewhat earlier or grow faster than is the case with *Asellus*. From observations I have made regarding the birth of the young *Asellus* and the rather slow growth of both species I can say almost with certainty, that these young ones of both species taken on July 6th are about two months old. Their habits were quite the same as those of the adults.

New records of *Mancasellus tenax* for Canada are as follows:

Several young ones (below 5 mm.) from under stones in bight canal at Alexandria Bay, Thousand Islands, N.Y., Sept. 1, 1919, (F. Johansen).

One full grown (13 mm.) male from among stones; Fairy Lake, near Hull, P.Q., May 5, 1918, (F. Johansen).

One adult, Fairy Lake, P.Q., April 25, 1920, (F. Johansen).

Many specimens (various sizes) from Bridgman's Creek, Chelsea Road, Hull, P.Q., May 9, 1920, (F. Johansen).

One adult (about 12 mm.) and many young (3-4 mm. ones from underside of stones; bight in

†Perhaps for breeding purposes (See C.A.E. report).

Ottawa river, Hull Park, P.Q., July 6, 1919, see above, (F. Johansen).

A dozen adults (about 12-14 mm. some of the females with eggs in broodpouch), from upper part of Wilson's Creek, De Grassi Point, Lake Simcoe, Ont., May 30, 1917, (E. M. Walker).

It is greatly to be desired that additional data concerning the distribution of this conspicuous and interesting species should be secured from localities north, east and west of the present records.

Far more common than *Mancasellus tenax* is the other species of freshwater isopod, *Asellus communis* Say. It has been known from Georgian Bay and Toronto, Ont., and in the United States from Massachusetts to Michigan. It will be seen from the new records given below that it has a much wider distribution in Canada than formerly known, though we have no definite records of it from the Maritime* and the western provinces. Nothing is known about its northern limit on this continent, except that it is very common around Ottawa, both on the Ontario and Quebec side. Its distribution is probably very much the same as that of *Hyaella knickerbockeri*, which means that it may occur in southern Alaska, but that it probably does not approach the barren grounds of this continent†. To a still larger extent than *Hyaella*, and in the same way as *Mancasellus* it appears to be a woodland species, and is therefore perhaps not found on the plains of the Canadian west. Where it occurs it is very common, and is found in great numbers both in rivers and large lakes and also in ponds and temporary pools and streams, both on clean bottom and also among much vegetation, dead leaves, etc.

In northern Europe this genus is represented by a closely allied species the well-known *Asellus aquaticus* Linn., which has been recorded by Packard from Labrador and may occur in Newfoundland. Not much has been recorded hitherto regarding the development (life-history) of *Asellus communis*. I am, therefore, glad to be able to add some original observations which I have made recently during my collecting trips to various localities in Canada. On April 20, 1919, I collected in a pool stream in swamp at Deschênes, P.Q., near Ottawa, some females, 1 cm. long, which had many white eggs in the broodpouch,‡ as well as some males, 1½ cm. long. These crustacea were placed in a jar for rearing, and two weeks later young ones that emerged were noticed. These latter were carried in the broodpouch of the mother-animal as late as May 6, (until the end of May in 1920),

moving freely around inside their cage, and when the mother-animal was touched some of the young ones would emerge and swim or crawl around.** These new born *Asellus communis* are from 1 to 1½ mm. long; they have practically the appearance of their parents (well-developed appendages, etc.), though the head is rounded and of the same width as the succeeding segments and the terminal plate (telson) correspondingly large. In color they were pale white, with dark eyes and the brownish intestinal canal and pale-pink "gills" (abdominal feet) shining through the cuticula. While sinking to the bottom or crawling over the latter the antennae, legs and "gills" move continuously, each kind of appendage performing its particular function (feeling, crawling, respiration). I kept these young isopods for several months and could easily have kept them longer, if I had had time to continue my observations. The energy with which they crawled around looking for food or sought to escape when I tried to catch them was certainly wonderful, all the appendages going in one whirl and the body twisting as well. When about a month old they were not much larger (about 2 mm.) than when first born; they were now becoming brownish. I preserved samples of them (June 2). It will thus be seen, that the first brood of the summer is born in the beginning of May (near Ottawa), and that their growth is rather slow. It is interesting to note that even egg (brood)-carrying females of this species are considerably shorter than the males (maximum size of females noticed 1 cm.), sometimes even only half the size (8 mm.), of the maximum size of the latter ones. Females secured at Gatineau Point, P.Q., near Ottawa on June 14, 1919, had the brood pouches empty; on the other hand females secured on July 6, 1919, in Hull Park, P.Q., had the eggs (second summer-brood) in the brood pouch. The same day (July 6) and place I secured also as has already been mentioned a 3 mm. long young *Asellus communis*, probably of the first summer-brood and now about two months old. It had already the grayish dorsal color of the full grown females (the color of the latter ones is less "spotted" and brown than that of the males), and could thus by its color alone be easily distinguished from the young *Mancasellus* of a corresponding (1 mm. larger) size also found on this date. Other female *Asellus communis* secured at Alexandria Bay, Thousand Islands, N.Y., on September 1st, 1919, had also eggs in the brood pouch, thus carrying what would probably be the third brood of the summer. Females from a pool near a quarry outside of Hull city, P.Q., collected on

*See additional notes.

†I found neither it nor *Mancasellus* along the arctic coast of Alaska and western Canada.

‡In 1920 the females first carried eggs in the beginning of May.

**I have observed the same in the case of *Mesodontha entomon* in the arctic.

October 5th, 1919, had unripe eggs in the brood pouch.

New records from Canada which I have for this isopod are:

Many specimens (about 5 mm. long and less) from stream pools at foot of Diamond Hill, Quebec City, September 19, 1919, (F. Johansen).

Many specimens (up to 7 mm. long) from bigh in canal at Alexandria Bay, Thousand Islands, N.Y., September 1, 1919, (F. Johansen).

Many (younger) specimens from Montreal West, P.Q., October 19, 1918, (A. Willey coll.).

A great number of specimens from pools, streams, lakes and the river near and at Ottawa, April to October, 1917-1919, (F. Johansen).

I thus have it from the Gatineau river, Gatineau Point, Hull Park and outside of Hull city, Bridgman's Creek, Chelsea Road, Catfish Bay, Fairy Lake, foothills of Kings Mountain, Deschênes, etc., on the Quebec side of Ottawa district and from McKay Lake, Rockcliffe, etc., on the Ontario side.

It is exceedingly desirable that further data regarding the distribution of this common and important food for fishes and birds in Canada, both north, east and west of the records from Canada known so far (Quebec City to Georgian Bay), should be secured.

One of the two freshwater isopods occurring in Canada, (*Mancasellus*) is thus to be considered a more southern form with a limited distribution; the other (*Asellus*) has a much wider distribution from east to west, though its records from the United States seem to indicate, that it may not be found in the western provinces of Canada, nor in Alaska.

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ADDITIONAL NOTES.

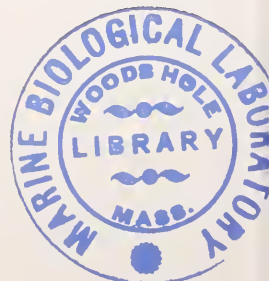
So little is known about the occurrence and habits of the freshwater-crustacea during the winter, that the following note in THE OTTAWA NATURALIST for September, 1907, p. 102, is of interest:

"Mr. W. S. Odell reports an abnormal abundance (during the winter 1906-7) of certain crustacea observed under the following circumstances. At the openings cut through the ice on the clay ponds or pits near the Rideau River, crowded masses of *Canthocampus*, *Cyclops* and *Asellus aquaticus** came to the surface of the water. . . . The ice was about a foot in thickness, and the cold was intense, yet these water animals had not been so thick for many years. They decreased most markedly on the first mild day. . . ."

In January, 1921, I received from Dr. A. G. Huntsman of Toronto, three *Asellus communis* Say, collected on October 31, 1920, near Milton, Yarmouth County, in southern Nova Scotia. Dr. Huntsman has kindly identified them as *Asellus communis* Say (same as *A. intermedius* Forbes). The specimens are in a poor condition; but as this is the first record of freshwater isopods from the Maritime provinces it should be included in this article.

*Probably *A. communis* Say (F.J.).

(To be continued.)



ARGULIDAE FROM THE SHUBENACADIE RIVER, NOVA SCOTIA.

BY CHARLES BRANCH WILSON, PH. D., STATE NORMAL SCHOOL, WESTFIELD, MASS., U.S.A.

A survey of the Shubenacadie river, which empties into the Basin of Minas, Nova Scotia, was recently made by Mr. A. H. Leim in connection with the Canadian shad fisheries. During this survey many specimens of both young and adult argulids were obtained at Shubenacadie with the tow-net in tidal water which seemed to be fresh rather than salt.

These specimens were sent to the present author for identification, and they proved to contain an abundance of both sexes of two species of *Argulus*, one of which had previously been found in many localities on the Atlantic coast farther south, while the other was new to science. The following record of these two species is herewith submitted.

ARGULUS ALOSAE Gould.

Argulus alosae Gould, Invertebrata of Massachusetts, 1841, p. 340, text figure; S. I. Smith, Report U. S. Com. Fish and Fisheries, 1872, p. 575 (281); R. Rathbun, Proc. U. S. National Museum, vol. 7, 1884, p. 485; J. F. Whiteaves, Cat. Marine Invertebrata of Eastern Canada, 1901, p. 216; C. B. Wilson, Proc. U. S. National Museum, vol. 25, 1902, p. 707, pl. 12; pl. 26, fig. 80.

Record of specimens. Ten specimens, including both sexes, were obtained August 1, 1919, at 8.45 p.m.: two males were obtained on the same date at 9.10 p.m.: a single male was obtained July 21, at 6.15 p.m.

Remarks. This species was doubtfully recorded by Mr. J. F. Whiteaves in the reference given above as attached to *Gasterosteus biculeatus* Shaw, and other small fishes taken off Pictou island in the Gulf of St. Lawrence. All the other recorded localities are much farther south. The present record substantiates that of Whiteaves and fully establishes the species in Canadian waters. Again it has hitherto been found only upon fish hosts in salt water; the present specimens were captured in a tow-net in fresh water. Their presence in the tow makes it certain that they infest fish in the immediate vicinity, and it may be that they will be found some day upon the shad whose name they bear.

ARGULUS PIPERATUS, new species.

Record of specimens. Twenty-two specimens, of which six were females and the rest males, were obtained August 1, 1919, at 8.45 p.m. in company

with the first lot of *Argulus alosae*. Another lot of ten specimens, including both sexes, were caught in the second towing, August 1 at 9.15 p.m. Five males were obtained July 31 at 9.50 p.m., and two males on the same date at 10.10 p.m. The majority of all these specimens were of small size although sexually mature. But a few of them were large enough to be regarded as fully developed adults, and from these the following description has been taken.

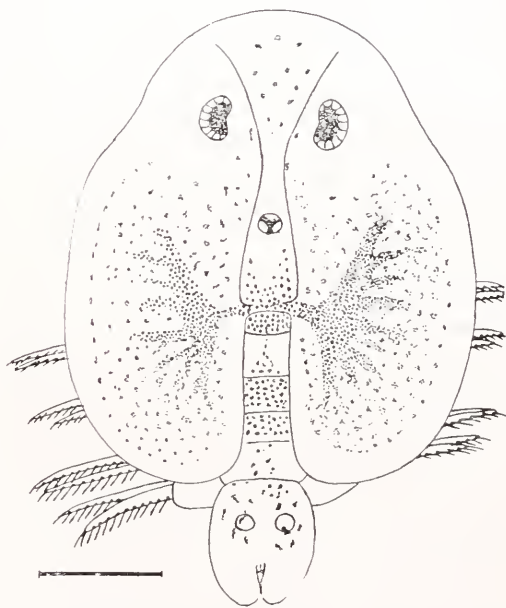


Fig. 1. Dorsal view of *Argulus piperatus*, female. The line represents a length of 1 mm.

Specific characters of female. General shape of the carapace elliptical, one-fourth longer than wide, with shallow lateral sinuses and broad, well rounded posterior lobes. Posterior sinus, one-third the length of the carapace, with parallel sides; posterior lobes just reaching the base of the abdomen. Eyes far forward and well separated.

Abdomen elliptical, one-fourth the length of the carapace, the longitudinal and transverse diameters in the proportion of 11 to 9; its posterior lobes well rounded and inclined inward so that their inner margins are in contact. Anal sinus 27.50% of the abdomen length; anal laminae basal, minute and unarmed; sperm receptacles small, circular and rather widely separated.



Fig. 2. *Argulus piperatus*: first and second antennae of male, much enlarged.

Lateral claw of basal joint of first antenna long and slender and curved into a half circle; anterior claw short and weak. Second joint slender, three times the length of the terminal joint, and armed at the distal anterior corner with a short spine; terminal joint tipped with two spines. Second antenna of the usual pattern, the basal joint one-half wider than the succeeding joints and tipped with a long spine; second joint with two spines, third and fourth joints with one spine each.

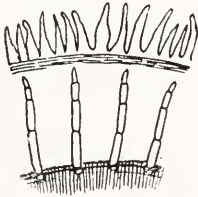


Fig. 3. *Argulus piperatus*: supporting rods in sucking disks: much enlarged.

Sucking disks of second maxillae far forward and well separated, each about 15% of the width of the carapace; the supporting rods slender and far apart, each made up of four cylindrical joints which diminish regularly in size from the base outwards, and which do not quite reach the margin. The latter has a fringe of flattened fleshy setae, attached side by side in a single row.

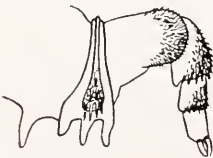


Fig. 4. *Argulus piperatus*: maxilliped of male; much enlarged.

The maxillipeds are rather short but stout; the triangular plate on their base is wide posteriorly and much narrowed anteriorly, but extends to the anterior margin of the appendage; the teeth are long and wide and bluntly rounded. Inside of the base of the appendage, on the ventral surface of the head, is an accessory tooth of the same pattern as those on the plate itself.

The rami of the swimming legs reach considerably beyond the margin of the carapace. The lobes on the basal joints of the fourth legs are small and not very prominent.

Color a light cartilage gray, the dorsal surface covered with small black dots, as though it had been sprinkled with pepper. These dots are not evenly distributed but are massed as shown in the figure.

Total length 5 mm. Carapace 4 mm. long, 3.25 mm. wide. Abdomen 1 mm. long, 0.90 mm. wide.

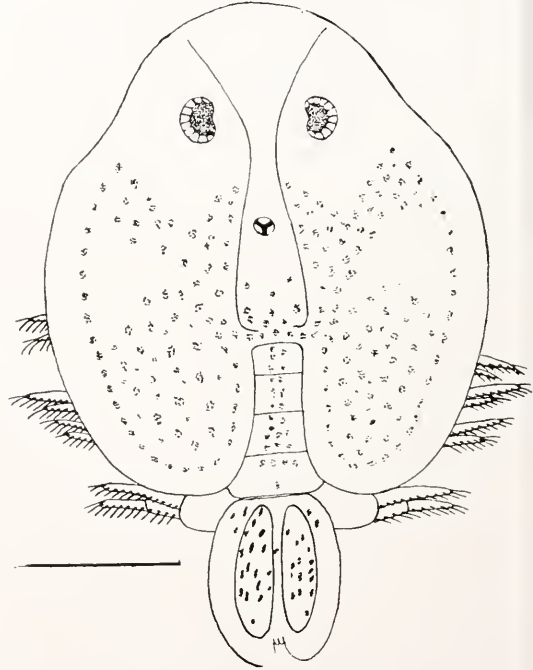


Fig. 5. Dorsal view of *Argulus piperatus*, male. The line represents a length of 1 mm.

Specific characters of male. Carapace relatively the same size and shape as in the female; abdomen longer, one-third the length of the carapace, the longitudinal and transverse diameters in the proportion of 15 to 11. Anal sinus not as deep, only 14% of the length of the abdomen and never closed by the approximation of the posterior lobes.



Fig. 6. *Argulus piperatus*: third legs of male, much enlarged.

Of the accessory sexual characters the peg on the anterior margin of the basal joint of the fourth legs is a broad cone, inclined strongly outwards and bluntly rounded at the tip, with a tiny spine on its

anterior margin. On the ventral surface of the basal joint of the third legs is a broad flap, projecting backwards, and on the anterior margin a rounded knob armed with minute setae.



Fig. 7. *Argulus piperatus*; fourth legs of male; much enlarged.

Color the same as in the female except that the black spots on the dorsal surface are larger and more scattered.

Total length 4 mm. Carapace 3 mm. long, 2.65 mm. wide. Abdomen 1 mm. long, 0.80 mm. wide. (*piperatus*, sprinkled with pepper, alluding to the black spots).

The types of this species are deposited in the Museum of the Atlantic Biological Station, St. Andrews, N.B.

BIRDS IN RELATION TO INSECT CONTROL.

BY NORMAN CRIDDLE, ENTOMOLOGICAL LABORATORY, TREESBANK, MAN.

The value of birds to mankind has unfortunately been brought down to the level from which we gauge most things nowadays, namely, dollars and cents. We might in the past, have classed them with art, poetry and music, but to-day the aesthetic side is lost in the mad rush for wealth and those of us who still value wild life for what it is, rather than for its economic significance, are obliged to weigh its qualities by the standard which modern thought demands.

The value of birds in relation to agriculture is a question that has frequently been discussed. The value of birds as destroyers of noxious insects is usually linked with the preceding problem though experts are not as unanimous in their conclusions regarding this part of the question, adverse contentions being especially strong among Italian entomologists who are apt to disclaim any assistance from birds to agriculture or kindred sciences. The Italians have their school of followers in North America but they are fewer. Since, however, they are men of ability it seems well to look rather more fully into the reasons for these differences of opinion.

Probably the first obstacle to unanimity lies in the fact that two sciences are involved namely ornithology and entomology whose votaries, on the whole, have but a superficial knowledge of each other's work. For instance, the ornithologist may be well aware that birds eat insects but he does not always know that the insects consumed may contain within them those that are useful. The entomologist on the other hand, knows little of the habits of birds and is, therefore, apt to view the question wholly as an insect one and to depend upon insects for insect control arguing that birds in eating a single noxious insect may destroy half a hundred useful ones, and so prevent the spread of allies that

would control a pest far more quickly than birds could, even supposing the latter were able to accomplish the task at all.

The first point to accept in this discussion is that insect extermination is cut of the question. The problem is not how to exterminate a pest but it is rather to secure the best means of keeping it within bounds.

I believe we shall eventually reach the conclusion that insect parasites are of most value in controlling serious outbreaks while birds reach their greatest usefulness by destroying the surplus under normal conditions and so prevent outbreaks. Neither of these differences in value are clearly defined, however, as a great many minor issues are involved in the whole question some of which I give below.

The rapid increase of an insect pest is due to several causes among which the absence of parasites is an important one. Under these circumstances the chances of birds destroying useful parasites in feeding upon the host at that time, is small, while by devouring the increasing pest they are playing an important part in keeping it within bounds. Occasionally, however, the pest increases beyond the rate at which birds can check it, this being due largely to meteorological conditions. At such times neither parasites nor birds are of much value and the pest spreads over wide areas as was exemplified in the grasshopper outbreak of the last two years in the Prairie Provinces. It is at this point that birds fall behind and parasites usually come to the fore and as these last have now unlimited food available they multiply with great rapidity. It matters little under these circumstances, whether birds devour parasites or not as the latter are too widely spread to be affected. Indeed the ultimate result is for the parasites to become over abundant in which case they are reduced to insignificance by starvation due

to the destruction of hosts. In eating the pest at this time birds are almost sure to devour even more parasites than hosts and by doing so they will actually help to preserve the latter by keeping down the surplus and so make room for those that remain.

One other point must be taken into consideration in connection with the part birds play in suppressing insect pests and that is while they may destroy numbers of parasites in eating the hosts they must necessarily prevent many of the hosts from depositing eggs thus enabling egg parasites and other egg enemies to concentrate upon those remaining. It might be contended on the other side, that birds are equally apt to destroy parasites in consuming insect eggs such blame being especially aimed at the Chickadee but I doubt very much whether the few useful insects destroyed in this way could compare with the value done by the birds in destroying thousands of insect eggs. Further, we must remember that many insect eggs are placed in the ground or in crevices, etc., where birds cannot get at them but where parasites can.

As a further point in the birds favour it may be pointed out that parasites are only present within the bodies of their hosts for a limited period of the hosts' life and, therefore, by eating the host before the latter becomes infested, birds are of unquestionable value to man; moreover, by this means they provide for a concentration of parasites upon the hosts that survive.

It will be noted that I have written nothing about hyperparasites in this paper, that is parasites which infest parasites. These complicate the whole question but to include them would not, I think, show birds in an unfavourable light.

Turning now to the part which birds play in actually devouring useful insects such as tachinid flies, syrphid flies, lady-beetles and other insects, we find that the birds by this habit actually reverse the arguments that have been used above but there is this in extenuation. With the exception of those I have mentioned and a few more, most of the useful insects (especially parasites) are small while the noxious ones are more often large and so easily detected. It would seem therefore, that far fewer useful insects are taken than harmful ones and this point is amply borne out by the examination of bird stomachs, as a glance through the bulletins of the U.S. Biological Survey will show.

One of the strong points in favour of the doctrine of insects controlling insects is illustrated in such pests as the hessian fly and western wheat-stem sawfly which are small and consequently little affected by birds. Naturally if these are kept in check by parasites there is not much reason why larger ones should not be. But the evidence is by

no means conclusive that they are. With the hessian fly meteorological factors are of importance at least in some parts of the insects' range and this probably applies to the sawfly also. The relation of humidity to insect prevalence is, indeed, a very important question which, however, requires a separate article to do it justice.

There are unquestionably times when even severe insect outbreaks are controlled locally through the actions of birds, a well known example of which occurred in Utah many years ago when a locust infestation was cleaned up by gulls. We need not, however, go so far afield for similar evidence of the usefulness of gulls.

During the years 1919 and 1920, a serious outbreak of grasshoppers, formerly called locusts, occurred in south-west Manitoba which threatened large areas of growing grain and required the united efforts of government officials and farmers to keep it in check. This outbreak extended from Saskatchewan far to the eastward but in this extension there was a notable gap most marked in the districts in which Boissevain, Whitewater and Ninga were situated. Since the soil is very similar over all this territory and offers equal inducements for grasshopper breeding the absence of the insects over it in destructive numbers might seem rather extraordinary, but I believe can be explained as follows: North of the villages mentioned above is a large marshy lake upon which a great many gulls and terns congregate and doubtless breed. In any case the birds make this lake their resting place and from it issue forth each day in quest of food. In the spring time before the small hoppers appear, the gulls may be seen in close attendance of the ploughman when they are often accompanied by black terns and frequently by crows and blackbirds all of which vie with each other in picking up the grubs and other insect life exposed by the plough. Later, when summerfallowing is under way and hoppers have attained sufficient size to be seen easily the gulls again devote much of their time to following the plough only now they spread out further afield and obtain a glorious feast of the grasshoppers which are endeavouring to make their way from the ploughed land to new feeding grounds.

At a still later date when harvest is beginning, the gulls and their allies take to the grain fields and roadways wandering up and down as if they imagined the waving grain were water and the grasshoppers the small fry swimming near the surface. But be that as it may the results are much the same. Many millions of grasshoppers have been eaten by the time the gulls take their departure and incidentally the farmer has reaped a far larger

crop than he would have done had the birds been absent. This, I think explains the absence of severe grasshopper outbreaks in the districts referred to.

There are very few birds that do not take advantage of a locust outbreak. Grouse find the insects especially palatable and several people are now learning to associate abundance of grasshoppers with the rearing of large families of grouse and this undoubtedly applies to several other birds.

It is, however, to those birds which congregate into flocks that we must look to most for help. I have already mentioned gulls in this respect, another is found in the crow. The crow is very fond of grasshoppers at any time and as the evidence shows, feeds its young largely upon them when they are sufficiently numerous. Indeed it is no exaggeration to state that a family of six crows would consume at least three bushels of grasshoppers in a season which would mean preventing about 9,000,000 of the insects' eggs from being laid.

In our grasshopper campaign of 1920 we ran across many instances of crows gathering in locust areas for feeding purposes. They were especially noticeable along roadways where fence or telephone poles afforded convenient resting places for their sentries. There is probably another reason for the crows gathering along roadways which is explained as follows: The outbreak of locusts referred to was made up of several species of which two were of special importance. These interestingly enough, have a marked difference in their choice of breeding sites, the one known as the Lesser-migratory locust choosing stubble fields or areas of semi-cultivation for egg-laying while the other, known as the Road-side locust, (*Camnula pellucida*) prefers the grassy road-sides for breeding purposes. On account of this habit the last-named insect is naturally massed within a comparatively small space which the crows have learnt to take advantage of.

Returning to the contention that birds frequently neutralize their usefulness in destroying noxious insects by eating the parasites at the same time, we have here at least a case where that was not so to any marked extent. Parasites of adult grasshoppers have been of small importance owing to their scarcity. Egg parasites, however, give far greater promise of eventually bringing the insects under

control. Here then we have a case where the destruction of adult locusts by birds will reduce the possible egg supply and oblige the insect feeding upon them to gather upon what remain, thus giving a far greater assurance of reducing the pest quickly.

I will conclude with one more example which, though not conclusive, provides at least strong circumstantial evidence in favour of the birds involved. Some twelve miles from my home at Treesbank, Man., is a pretty little village surrounded by hills and trees, where crows have bred rather freely in the past. A few years ago, however, prominent citizens of this place came to the conclusion that the crows were greatly reducing the bird life, especially game birds, which the citizens looked upon as their own special privilege to kill. In consequence of this belief, these people inaugurated crow-destroying competitions in which they formed sides of equal number, those bringing in the greatest number of crows and their eggs winning a prize, which the losers had to pay. The result of this annual competition in crow destruction has had a marked effect upon crow life in the vicinity without apparently producing very noticeable results in the direction expected. What interests us here, however, is this. The district, which is a grain-growing one, was infested by a severe and isolated outbreak of grasshoppers last year, while surrounded areas where crows had been protected escaped. As I said above, this may be a coincidence, but since the region is no more suitable for grasshoppers than others nearby, such would hardly seem to be the case.

In the preceding remarks no effort has been made to plead the cause of birds, the evidence has merely been given as it was presented to me in the field. I have said nothing of the aesthetic side, yet few can depict anything more beautiful than a flock of gulls following a ploughman, flying with their graceful curves within a few inches of his head and darting down with a characteristic little flutter to pick up the insect newly exposed. To see them flying over the lakes is equally pleasing, and we ought surely to be thankful in realizing that such perfect creatures are our friends. This can be said with almost equal justice of many other birds, which, if they are not as pleasing to look upon, make up for that by a sweeter song or some other characteristic which should endear them to us.

ADDITIONS TO THE BIRDS OF SHOAL LAKE, MANITOBA.

BY ERNEST S. NORMAN.

The following species of birds have been observed by me at Kalevala, Man., which is situated approximately about 25 miles north of the north end of Shoal Lake.

RED-THROATED LOON, *Gavia lumme*. This bird is seen on Birch Lake, near Kalevala P.O., nearly every fall just before freeze-up. It arrives here generally several weeks after the common Loon and the Holboell's Grebe have left for the south. Only one or two seen at a time.

AMERICAN SCAUP DUCK, *Aythya marila*. Regular summer visitor, though perhaps less numerous than the Lesser Scaup. I have never found its nest though the Lesser Scaup's nests are often discovered.

TURKEY VULTURE, *Cathartes aura*. One individual of this species was seen several times in the spring of 1919. It came every day for two or three weeks to feed on a horse carcass, at which I had set some wolf traps on the winter previous. It was very tame and I had many chances of seeing it at very close range, being thereby able to establish the identity beyond any doubt.

COOPER'S HAWK, *Accipiter cooperi*. This hawk is only an accidental summer visitor here. Nevertheless, I have seen it several times during the last six years.

GOLDEN EAGLE, *Aquila chrysaëtos*. One adult in a beautiful plumage was shot by Mr. G. Carlson, of Mulvihill, Man., in the summer of 1916. Mr. Carlson brought this bird to me for identification and later on sent it to Mr. W. Darby, the taxidermist, in Winnipeg, for mounting.

GREAT GRAY OWL, *Scotiaptex nebulosa*. One morning in February, 1918, I noticed an unusually long and fluffy feather hanging in a willow bush near my barn. I at once knew that it was that of an owl, but had never met here any species of owls with such tremendously long feathers. Several days later the puzzle was solved, when, in broad daylight a Great Gray Owl (the first one and only one that I have seen) flew to a shade tree in front of our house. It stayed around for several weeks after that.

RICHARDSON'S OWL, *Cryptoglaux tengmalmi richardsoni*. In the winter of 1914-15, several birds of this species were seen. They were very tame, coming sometimes in broad daylight into the barnyard where they could have been knocked down with a

stick. None have been seen since.

SAW-WHET OWL, *Cryptoglaux acadica*. I saw one specimen of this little owl in June, 1918. I saw it on several occasions in one particular spot in a poplar bush. Hunted for the nest high and low, but it could not be found.

AMERICAN HAWK OWL, *Surnia ulula caparoch*. In the winters of 1914-15 and 1915-16 this was by far the most common of all the owls. It is possible that they were breeding, as few were met with right in the breeding season, in 1915. Not a single one has been observed here in the last three years.

ARCTIC THREE-TOED WOODPECKER, *Picoides arcticus*. Regular, though rare, winter visitor at Kalevala, Man. One or two can be seen in the poplar forests north of our post office almost any day during the cold weather.

NORTHERN PILEATED WOODPECKER, *Ceophlacus pileatus abieticola*. This largest of our northern woodpeckers was very common here six and seven years ago, when the first settlers arrived. On account of their unwary habits many of them fell easy victims to the Sunday hunter and the boy with "the 22." It has been entirely absent for two or three years, but last autumn (1919) a pair came into our poplar woods (where they are protected) and have stayed there all winter. They were seen nearly every day hammering at a large poplar stub just a short distance from our barn. As many of the largest poplars in our bush have very large holes excavated into them, it is almost certain that these birds used to breed here regularly not so very many years ago.

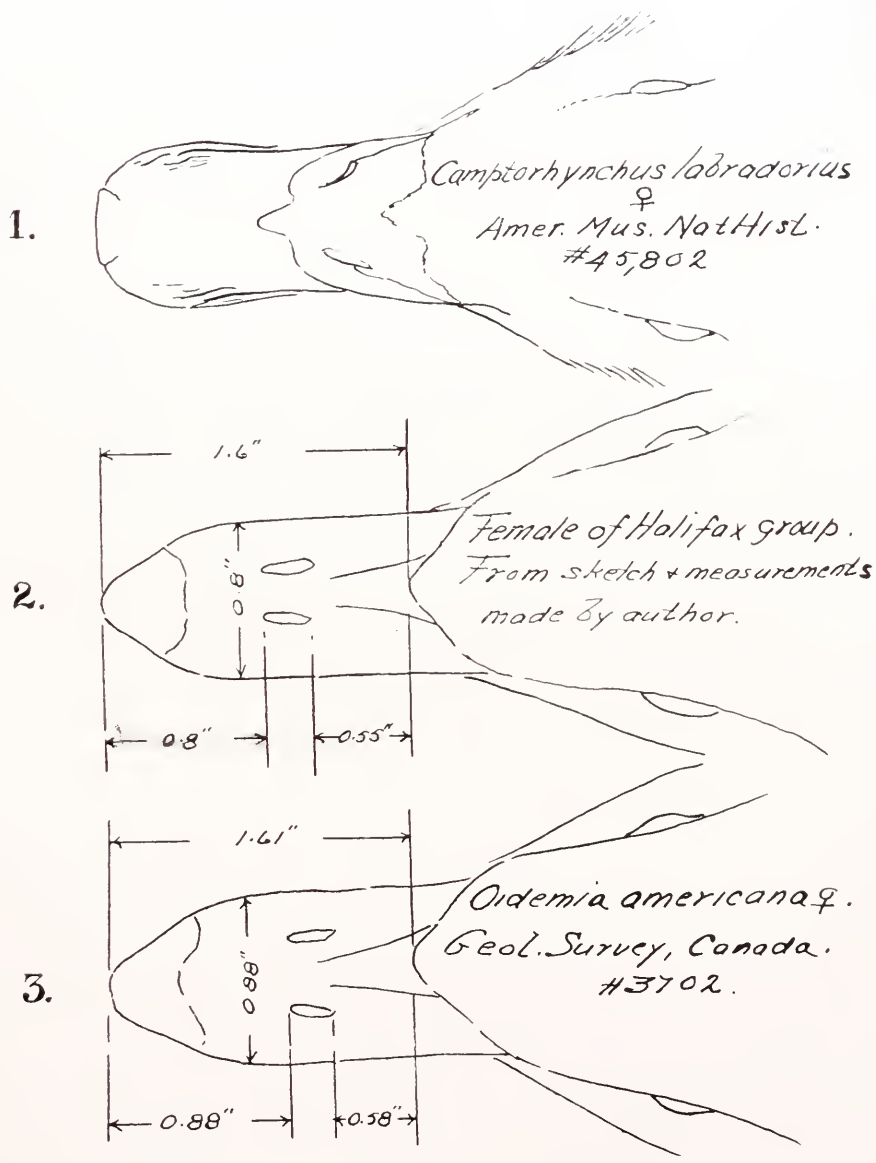
PINE GROSBEEK, *Pinicola enucleator leucura*. Common winter visitor at Kalevala, Man. Generally appears in small flocks from 4 or 5 to a dozen birds of both sexes. They are very tame and feed mostly on frozen high-bush cranberries.

REDPOLL, *Acanthis linaria*. Common winter visitor. Sometimes large flocks of several dozens of birds are seen. They feed on weed seeds and are far too tame for their own safety. The ordinary house cat generally catches more than its share of them.

WHITE-BREASTED NUTHATCH, *Sitta carolinensis*. Resident. Can be seen here any day both summer and winter.

THE DUCK SPECIMENS RECORDED AS LABRADOR DUCKS (*CAMPTORHYNCHUS LABRADORIUS*) IN DALHOUSIE COLLEGE,
HALIFAX, NOVA SCOTIA.

By HOYES LLOYD.



1 - Traced from original drawing
by Louis Agassiz Fuertes.

2&3 - by P. A. Taverner.

William Dutcher¹ revised the list of extant specimens of this extinct species in the collections and museums of the world. His totals were Canada 2; United States 25; Europe 11; amounting to 38 in all.

Subsequently A. B. Meyer² recorded a specimen in the Dresden Museum, Saxony, and Dr. Wilmer Stone³ recorded one from an old collection which brings the list of total known specimens to 40, distributed as follows: Canada 2; United States 26; Europe 12.

It may not be generally known that two of the 28 North American specimens a male and a female were reported by Dutcher on the authority of Thomas I. Egan and Andrew Downs as being in the collection of Dalhousie College at Halifax, Nova Scotia.

In April, 1919, I had the pleasure of visiting Dalhousie College and through the courtesy of Professor Moore was allowed to examine these specimens, both of which are mounted and carefully preserved under glass.

One is a male Labrador Duck (*Camptorhynchus labradorius*) in full plumage and the other is an

American Scoter (*Oidemia americana*) in the plumage of the female.

At the time, I neglected to notice the speculum of the bird in question, but Mr. R. W. Tufts, of Wolfville, Nova Scotia, has since examined the specimens to make sure of this point, and he reports that the supposed female Labrador Duck is so mounted that the characteristic speculum of that species would not be shown if it were present, but close examination of this specimen shows the absence of the special wing marking of the Labrador Duck.

Aside from this, the bill of the supposed female Labrador Duck shows it to be an American Scoter. To emphasize this point a sketch showing the upper aspect of the beaks of these two birds was drawn to scale and a comparative sketch showing the bill of a female Labrador Duck has been kindly prepared for me by Louis Agassiz Fuertes. These are shown in the figure.

It is stated with much regret that only one specimen of the Labrador Duck is known to exist in Canada today, and not two as has been supposed.

Note.—Fleming saw one in Montreal some years ago, which was not the specimen purchased by Dutcher, but its present condition, if still in existence is unknown.

1. The Auk, Vol. VIII, 1891, p. 201.

2. Ibid., Vol. IX, 1892, p. 389.

3. Ibid., Vol. X, 1893, p. 363.

NOTES AND OBSERVATIONS.

THE PROTHONOTARY WARBLER AT LONDON. On May 30, 1920, at 5.25 a.m., my attention was attracted by the notes of a Swamp Sparrow which was singing in a large elm tree. For the reason that Swamp Sparrows do not go up into large elms to sing, I set about locating this one to make sure of the identification, but before I could locate him in the tree, he flew into some willows only ten or fifteen yards away, and again started singing. I saw at once that he was no Swamp, but a warbler, and the glass showed pure yellow beneath, and pure yellow on top of the head, coupled with a tail that appeared very short and a bill larger in proportion than I remember on any other warbler. A Prothonotary, without the shadow of a doubt! Further study of his song indicated that while a Swamp Sparrow sings from four to six notes per second, the warbler was much more deliberate and used two seconds for his song which was invariably of six notes on the same pitch, and almost identical with the Swamp in tone. This is my first Prothonotary, and the second one this century in Ontario,

the other being a specimen taken at Pelee by Taverner about 1915. Macoun's Catalogue quotes one specimen taken at Hamilton, and sight records, indefinite at that, from Toronto (Fleming) and N.B. (Chamberlain). Apparently there are two Canadian specimens in existence.

An eager party hunted my bird that Sunday afternoon, and I was after him with a gun on Monday, but when he left me, as he did in a few minutes, he flew east beyond hearing, and has not been heard from since.—W. E. SAUNDERS.

EPICUREAN TASTE IN SWALLOWS.—Near the village of Shazy, New York, lies Hearts Delight Farm, the property of W. H. Miner, who is not only a farmer at heart and in fact, but a lover of nature and of all things elevating and good.

Given such a man and a farm of 12,000 acres, with sufficient desire and opportunity for improvement along aesthetic as well as economic grounds, the ultimate achievement can hardly be forecasted.

At Hearts Delight, achievement is magnificent, but one phase only is to be noted here.

Protection of wild life, animate and inanimate, holds a prominent place in the owner's plans, and there the wild things may find home locations suited to their varied needs, and the woods and fields are everywhere vocal with bird song. Among others, Swallows are abundant, and the great feature of the splendid farm is the group of three enormous Martin houses on one of the large lawns. Two of these houses are nearly equal in size, about 4 by 7 feet, with perhaps 200 domiciles in each. The large one is 8 by 12 feet and contains about 400 domiciles. As nearly as one can see, every cavity is occupied, a very few of them with House Sparrows, but practically every one with Martins; which would mean in the neighbourhood of 800 pairs of these useful birds. At the rate of only four young to each nest, 5,000 birds would need to be fed everyday from June 10 to August 20. Surely the unfortunate insects that form the food of these birds, ought to become scarce, compelling long flights on the part of the parents to supply their young.

One seems to have an instinctive feeling that Swallows, catching their food on the wing, feed on almost everything that comes along, and that they hunt the whole air in general. Perhaps that is because we have an idea that we would act that way if we had the ability.

My experience at Chazy, on July 7, 1919, gives me a hint that this rule (of my own imagination) does not invariably apply. Here is a place where Martins are living in vast numbers, and yet, hawking over the lawn by the house, all day long, were Barn Swallows, and Barn Swallows only!

Why no Martins, and why the Swallows, if no Martins?

Questions are easier to ask than to answer.

All one can say in reply is that the Swallows were there, and that the Martins, though nesting absolutely in thousands within a quarter of a mile, were absent. Investigation showed that the grass of the lawn was infested by an insect, less than $\frac{1}{2}$ inch long. Passing the hand over two or three feet of the grass would invariably cause one or more of these insects to rise from the grass, and after flying never more than eighteen inches high, and four feet in distance, they settled again. This low, short flight accounted for the motions of the Swallows, who were hawking back and forth at from one to two feet over the surface, swerving in their flight at intervals when an insect was to be caught.

The reasonable explanation is that these insects were very palatable to the Swallows, and unattractive to the Martins, but why this should be the case is a puzzle. There can be no doubt that the Martins knew of this source of food, because birds

find out such things with marvellous facility when the facts are of sufficient interest, but why should an insect be so attractive to one species of bird, and so lacking in interest to another species, when so closely allied?—W. E. SAUNDERS.

PROSECUTIONS—MIGRATORY BIRDS CONVENTION ACT AND NORTHWEST GAME ACT BY OFFICERS OF THE DOMINION PARKS BRANCH AND ROYAL CANADIAN MOUNTED POLICE.

MIGRATORY BIRDS CONVENTION ACT.

Francois Mandeville, Fort Smith, Northwest Territories, interfering with a game officer in the discharge of his duties. Fine \$10.00 and costs.

William Goss, Kensington, Prince Edward Island, buying Canada Geese in closed season. Fine \$10.00 and costs.

Austin Fluke, Gaspereau, Nova Scotia, possession of Black Ducks in closed season. Fine \$10.00 and costs.

Fred B. Cox, Labrador Coast, Quebec, possession of Ducks in closed season. Fine \$10.00 and costs.

John P. Cox, Halifax, Nova Scotia, possession of Eider Ducks in closed season. Fine \$10.00 and costs.

John Chapman, Mossbank, Saskatchewan, shooting at Wild Ducks in closed season. Fine \$10.00 and costs.

Charles Elder, Mossbank, Saskatchewan, hunting Wild Ducks in closed season. Fine \$10.00 and costs.

William Pace, Meadowvale, Colchester Co., Nova Scotia, possession of a Downy Woodpecker. Fine \$10.00.

W. L. Hendsbee, Hawkesbury, Nova Scotia, possession of Gull. Fine \$10.00.

Nicholas Eull, Minnesota, U.S.A., shooting at Ducks in close season near Cudworth, Sask. Fine \$10.00 and costs.

Tilman Landry, 7 Highfield Street, Amherst, Nova Scotia, possession of a Great Blue Heron. Fine \$10.00 and costs.

Lucien Tinant, Oban, Saskatchewan, possession of nine Ducks in closed season. Fine \$15.00 and costs.

Louis Blean, Montcalm Market, Quebec, P.Q., possession of Semipalmated Sandpiper. Fine \$10.00 and costs.

Frank Pattenden, Bayfield, Westmoreland Co., New Brunswick, shooting Semipalmated Sandpiper. Fine \$10.00 and costs.

Fern McMorris, Bayfield, New Brunswick, possession of three Semipalmated Sandpipers. Dismissed.

Charles Bent, Bayfield, New Brunswick, possession of Sandpiper. Fine \$10.00 and costs.

James E. McDonald, Mira, Cape Breton Co., Nova Scotia, killing Scoters from a power-boat. Fine \$10.00 and costs.

Frank Wheeler, Dominion, Cape Breton Co., Nova Scotia, possession one "Ring-necked Plover." Fine \$10.00.

Robert Weaver, Doaktown, New Brunswick, in possession Pileated Woodpecker. Fine \$10.00 and costs.

Charles Grotto, Trenton, Nova Scotia, attempting to kill Greater Scaup Duck by use of power-boat. Fine \$10.00 and costs.

Daniel Levy, Little Tancook, Lunenburg Co., Nova Scotia, attempting to kill Black Duck by the use of a motor-boat. Fine \$20.00 and costs.

Harvey Cross, Big Tancook Island, Lunenburg Co., Nova Scotia, attempting to kill Black Ducks by the use of a "Sunken Boat." Fine \$20.00 and costs.

William Heizler, Oakland, Lunenburg County, Nova Scotia, attempting to kill Ducks by the use of a power-boat. Fine \$20.00 and costs.

William Murdock, New Glasgow, Nova Scotia, attempting to kill Greater Scaup Duck by use of power-boat. Fine \$10.00 and costs.

Walter Winsloe, Trenton, Nova Scotia, attempting to kill Greater Scaup Duck by use of power-boat. Dismissed.

Alexander Grotto, Trenton, Nova Scotia, attempting to kill Greater Scaup Duck from a power-boat. Dismissed.

NORTHWEST GAME ACT PROSECUTIONS.

W. F. Dow, Fort Rae, Northwest Territories, possession two Musk Ox skins. Seizure.

D'Arcy Arden, Dease River, Great Bear Lake, Northwest Territories, possession Musk Ox skins. Seizure.

BIRD BANDING WORK BEING TAKEN OVER BY THE UNITED STATES BUREAU OF BIOLOGICAL SURVEY.—

The Bureau of Biological Survey at Washington, D.C., has taken over the work formerly carried on under the auspices of the Linnaean Society of New York by the American Bird Banding Association. In taking over this work the Bureau feels that it should express the debt that students of ornithology in this country owe to Mr. Howard H. Cleaves for the devotion and success with which he has conducted this investigation up to a point where it has outgrown the possibilities of his personal supervision.

Under plans now being formulated this work will give a great amount of invaluable information concerning the migration and distribution of North American birds which will be of direct service in

the administration of the Migratory Bird Treaty Act, as well as of much general scientific interest.

It is desired to develop this work along two principal lines;—first, the trapping and banding of waterfowl, especially ducks and geese, on both their breeding and winter grounds; and secondly, the systematic trapping of land birds as initiated by Mr. S. Prentiss Baldwin, the early results of which have been published by him in the *Proceedings of the Linnaean Society of New York*, No. 31, 1919, pp. 23-55. It is planned to enlist the interest and services of volunteer workers, who will undertake to operate and maintain trapping stations throughout the year, banding new birds and recording the data from those previously banded. The results from a series of stations thus operated will undoubtedly give new insight into migration routes; speed of travel during migration; longevity of species; affinity for the same nesting-site year after year; and, in addition, furnish a wealth of information relative to the behavior of the individual, heretofore impossible because of the difficulty of keeping one particular bird under observation.

The details of operation are now receiving close attention, and as soon as possible the issue of bands will be announced, with full information regarding the methods to be followed and the results expected. In the meantime, the Biological Survey will be glad to receive communications from those sufficiently interested and satisfactorily located to engage in this work during their leisure time, for it is obvious that a considerable part must be done by volunteer operators. It is hoped that a sufficient number will take this up to insure the complete success of the project.—E. W. NELSON, *Chief of Bureau*.

MIGRATION STUDIES BY BIRD BANDING.—The work of bird-banding referred to above by Dr. E. W. Nelson, which is now being taken over by the U.S. Biological Survey, is a system of placing registered numbered aluminum bands on the legs of birds which are then liberated so if again taken information may be derived on their lives, habits and movements. The amount of exact information that might be obtained in this and in no other practical manner is very great indeed. For years we have each had ideas as to whether birds returned to their old haunts year after year, the permanency of their matings, ages, routes of travel, etc., but it was mostly guesswork and authorities disagreed. Under the bird-banding association organized under Mr. Harold Cleves and others some of these questions are in a fair way of exact solution.

Our own Jack Miner, of wild goose fame, whilst working independently of the bird-banding association has done considerable in this direction with the wild fowl. His geese banded at Kingsville,

near Lake Erie, Essex Co., Ontario, have been taken on the Atlantic Coast from New Jersey to North Carolina and along the east shore of James and Hudson Bay. He has had returns also from ducks from Louisiana and the Gulf States, north to Sault Ste. Marie and west as far as Alberta. These irregular (?) migration routes are of special interest in confirmation of the soundness of the view that proper protection of migratory game is an inter-provincial problem more than a local one and well within the logical field of federal authority.

The systematic trapping done by Mr. S. Prentiss Baldwin mentioned by Dr. Nelson is a development of these activities and has opened up unlimited possibilities to the work. Normally but very few land birds banded are ever heard of again. In the work cited some surprising and valuable results have resulted from constant and systematic trapping of small birds within a limited area. A box trap made of fine meshed poultry wire is used which captures the birds without injury and from which they can be removed, banded and released, without other damage than a little passing fright. To show how evanescent this is Mr. Baldwin says that many individuals acquire what he calls "the trap habit" and return again and again, even many times a day, to the annoyance of the trapper, for the easily secured food supplies offered by the bait and they even wait patiently for the apparently expected liberation. All told he has so handled some five thousand birds in this manner and amongst the most interesting facts that the work has brought out are the following.—

Many birds do return to the same locality year after year but not always to the same spot. The chances seem to be about one in five, that at least one of a pair will return to the previous year's nesting site and about one in twenty-five that both will. In some cases birds that seemed to be the same as last season's friends proved to be entire strangers whilst the old marked ones were found nesting at some little distance.

The martial tie is somewhat looser in some cases than had been expected and not only do some birds often change mates from season to season but even for successive broods during the same season. A second brood in a nesting box was found to have one new parent whilst the jilted one was discovered helping to care for another family nearby.

It is also shown that as soon as the young are out of the nest they are usually taken immediately quite away from the vicinity. A family of young Wrens were found at the end of the first day some three hundred yards distant from their natal home.

The average daily range of many birds is surprisingly restricted. With traps set one hundred yards apart "repeaters," birds returning again and again to the trap, were rarely taken more than one trap away from their usual station.

Not only do birds return annually to their summer homes but to their winter ones as well and even along the way between follow the same locality stations year after year. Migrants merely passing through, have been taken on successive years, up to three, under the same bush.

Another bit of interesting evidence is on the actual mechanics of migration. It seems that the species studied do not pass along on their vernal and autumnal passages doing daily stints of travel, but pause for a while here and there where food is good and while the weather is fine, to pass on with, or just before, the storm that brings others of their kinds along.

All this is most interesting and valuable work and is such that many of otherwise limited opportunity can follow and, whilst indulging in a pursuit, fascinating in itself, amass a large amount of information of great popular, economic and scientific value. It is well that such important work is being directed by the experienced Bureau of the Biological Survey and that steps will be taken to extend its scope and correlate its results.

P. A. TAVERNER.

THE JAEGER AT SYLVAN LAKE, ALTA.—While living at Sylvan Lake, Alberta, this summer, I was fortunate enough in September, to observe a fine Jaeger attacking a Common Tern. This gave me a splendid opportunity to observe this unusual visitor. When finally the Tern escaped, the Jaeger settled on the water, and with my prism binoculars I was able to note its every feature. The upper parts were very dark while the throat underparts appeared to be a creamy white.

This is the second time I have seen this species at Sylvan Lake. In June, 1916, hearing an unusual note above the din of a large flock of Franklin gulls feeding in the bay, I saw what for the moment I took to be a fish hawk swooping about amongst the gulls, but as it poised above them for a second I was amazed to see the long middle tail feathers. Shortly after it settled on the water, and I watched it for a long time with my binoculars. I did not report this occurrence outside my own circle of friends, thinking I would not be believed, but, now with the advent of the second one I am glad to report this record for Alberta.—ELSIE CASSELS.

BOOK NOTICE.

BIRDS OF EASTERN CANADA, Memoir 104, No. 3. Biological Series, Geological Survey of Canada, by P. A. Taverner: King's Printer, Ottawa, 1919. 297 pages, octavo with 50 colored plates, illustrating 105 species and varieties; price 50 cents.

The introduction to this work is unusually attractive, and will be found both interesting and instructive to the student of Birds. It deals with classification, distribution and other problems and even has a chapter on Attracting Birds about the home.

The index appears very complete and comprises English, French, and scientific names.

A most useful feature, that might well be copied in similar works is the description of the different classes, orders and families. Too often the young student is left to surmise as to the scope of these divisions of the science.

One of the most attractive features of the book is the inclusion of the section "Field Marks." No other part of the work will receive as earnest study from puzzled nature students, to whom unidentified birds are a frequent experience. After one has pursued birds long enough to have identified 75 species, he is apt to make a good guess at the identity of any unknown, and needs only confirmation from a book to change surmise into certainty, and the section under consideration provides easy reference for such a puzzle.

The key is good, but if a key is worth providing, it is worth while to carry it out to the limit, and not abandon the seeker after knowledge at the broad heading "Sparrows," and leave him to grope through 34 different species, when a color key could easily have been given on a few added pages.

The colored plates, by Frank Hennessey, are on the whole, very creditable. Indeed, the colors are exceptionally true to nature. It would seem to the writer that this book illustrates well a missed opportunity. To certain of a large circle of readers, it is regrettable that the contents of the book are limited so nearly to bare outlines. It has come out as very little more than a book of reference, wasting a splendid opportunity to change casual readers into bird-loving enthusiasts. There are so many interesting details of bird life that could be added to such work, and the author is so competent to add them, that

one is almost tempted to regret that the book was sent out ill equipped for what might have been a greater accomplishment.

It happens to come within the scope of the reviewer's knowledge that the added touches, without which the book makes comparatively uninteresting reading, were actually provided by the author, and were eliminated by a mistaken editorial policy. The reason, for the elimination is unknown, but could hardly have been aught than either poor judgment or economy. For the sake of the future, it is to be hoped that it was not the former, and if the reason were economy, it was a most erroneous application of the term. True economy lies in the production of the greatest and best results at a reasonable cost. In the case of a train from Toronto to Ottawa, there might be an economy of coal in stopping the train 10 miles before its destination, but no one would be so deluded as to claim real economy in throwing the passengers on their own resources for the last ten miles, when the equipment was ready to complete the journey. The present instance is a parallel. The names of the birds have been published, descriptions added, field marks, nesting, distribution, all of the skeleton on which to hang vital and interesting facts, clothed in language that would attract the casual reader and open many eyes to the charm that lies in this as in every other department of natural science, but the opportunity has been lost through no fault of the author.

It is so unusual, in such a work to omit all details of the capture of rarities, that the reviewer cannot become sufficiently accustomed to the change to consider it other than an error of omission. Take for instance, Blue-wing Warbler. "Though taken only once in Canada," how much better to have said, "One taken at Point Pelee on September 2nd, 1906, is the only Canadian specimen." The information might just as well have been given definitely while the writer was at it, and the book would have been worth just that much more as a reference.

Perhaps one may be judged meticulous for such fault finding, but the duty of the reviewer is to state the case as he sees it, in the hope that his opinion may have a favorable influence in the future.

W. E. SAUNDERS, London, Ont.





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THE VERTEBRATES OF THE OTTER LAKE REGION, DORSET, ONTARIO.

By A. H. WRIGHT AND S. E. R. SIMPSON.

(Continued from Vol. XXXIV, page 145).

IV.—THE BIRDS.

By A. H. WRIGHT AND S. E. R. SIMPSON.

The birds of this region have received attention through all the years of this camp's establishment. Each year either at the beginning of camp or in the later portion, bird contests have been held and almost every year of its ten years' existence the camp has had a naturalist among the councillors in residence from June 28 or July 1 to September 1 or 10. This list is based mainly on the records of the two authors for the seasons of 1913 and 1919, and is now put in form to stimulate recording of subsequent finds. We are sure there are forms omitted but some of the naturalists did not keep notes and prefer to leave almost certain observations unrecorded because of memory's tricks. Our list then is almost solely a summer list with several additions in prospect. It numbers 122 species. Comparable notes are those of Messrs. W. E. Saunders¹ and John M. Cooper² on birds observed in Algonquin Park.

Our greatest thanks are due to Mr. J. H. Fleming³ for his courtesies previous to our trip. In many ways the most useful list in the field was his "List of the Birds of the Districts of Parry Sound and Muskoka, Ontario," also his "Birds of Toronto."⁴

The authors have found very helpful Macoun's and Macoun's Cat. of Canadian Birds; the works of C. W. Nash and Thomas McIlwraith; and the subsequent work on "Birds of Eastern Canada, 1919," by P. A. Taverner to whom they owe favors for assistance in 1913. Of assistance were the three lists of "Birds of Ottawa" in this journal (1881, 1891, 1910-11). Subsequent work can well center on fall migration, breeding data, more

records of waterfowl, shore-birds and birds-of-prey. There are twenty or more species yet to be sought in summer or previous records which need verification.

1. *Colymbus auritus* Linn. Horned Grebe.

One reported from Lake of Bays, August 22, 1911, by Mrs. J. M. Haber.

2. *Podilymbus podiceps* (Linn.). Pied-billed Grebe.

Present in summer but scarce in this region. Mr. G. M. O'Connell reports them from Lower Fletcher lake where the residents claim they were more common in earlier days.

3. *Gavia immer* (Brunn.). Loon.

Common on all the lakes and one of the most distinctive birds of the Lake of Bays country. A nest with two eggs found on an island in Otter lake the last week of June, 1919. Later, July 7, two young were seen on Otter lake. In 1913, the newly hatched egg shells were found on an island on Otter lake. Young not infrequently observed throughout the region. Several nests have been found on Otter lake since the camp was established.

4. *Larus argentatus* Pont. Herring Gull.

Common on Lake of Bays; less frequent in the smaller lakes to the northward.

5. *Mergus americanus* Cass. American Merganser.

The most common duck of the lakes of this region. Every lake has a pair or more and one of the most spirited sights is a parent bird with its young. They either swim away or frequently half swim and half fly along the surface to a safe distance. These broods are frequently recorded in the first weeks of July and even later.

6. *Lophodytes cucullatus* (Linn.). Hooded Merganser.

Mr. L. A. Fuertes observed a female with a flock of four to five young.

7. *Anas rubripes* Brewster. Black Duck.

In 1919 common on all the lakes in August and present every season.

(1) Saunders, W. E., Birds of Algonquin Park. The Ottawa Naturalist, Vol. XXIX., Feb., 1916, No. 11, pp. 145-150.

(2) Cooper, J. M., Ottawa Naturalist, XXX., No. 10, Jan., 1917, pp. 125-129.

(3) Auk., Vol. XVIII., pp. 33-45.

(4) Auk., Vol. XXIII., pp. 437-453; XXIV., 71-89. Also "Birds" in "Natural History of the Toronto Region, 1913," pp. 212-237.

8. *Aix sponsa* (Linn.). Wood Duck.

One female was seen at outlet of Otter lake, August 21, 1919, the same locality in which it was reported in 1913. Also reported by G. M. O'Connell, Mrs. A. T. Kerr, and others.

9. *Botaurus lentiginosus* (Montag.) American Bittern. "Plum Gudgeons," "Stake Drivers," "Bill Gudgeons."

Scarce. One seen August 16, 1919 in a marsh at Hardwood lake. One recorded at North Bay in August, 1911, by Mrs. Julia Moesel Haber.

10. *Ardea herodias* Linn. Great Blue Heron.

Common. Capt. Jones, fire ranger reports them as nesting at Crain lake.

11. *Nycticorax nycticorax naevius* (Bodd.). Black-crowned Night Heron.

One in immature plumage recorded on August 27, 1913 at Camp lake.

12. *Gallinago delicata* (Ord.). Wilson's Snipe.

The natives report a few in these lakes in the summer, but we have not seen this species as yet.

13. *Ereunetes pusillus* (Linn.). Semipalmated Sandpiper.

Reported August 16, 1919, in lower Algonquin Park.

14. *Totanus flavipes* (Gmel.). Yellow-legs.

Three were seen August 26, 1913, at Fletcher Lake by G. O. McConnell. One reported from Algonquin Park by C. Huber, August 16, 1919.

15. *Helodromas solitarius* (Wils.). Solitary Sandpiper.

One was seen at a marsh near Otter lake, July 12, 1919. On August 24, two were seen at the same place with young.

16. *Actitis macularia* (Linn.). Spotted Sandpiper.

Common.

17. *Oxyechus vociferus* (Linn.). Killdeer.

One was heard August 2, 1913 near Dorset, also another August, 1919 at Crozier lake. A female with three young were seen August 21, 1911, by Mrs. Haber at North Bay.

18. *Aegialitis semipalmata* (Bonap.). Ring-neck Plover.

One reported at Otter lake, August 19, 1913.

19. *Canachites canadensis* (Linn.). "Spruce Partridge."

Dr. Abram T. Kerr reports a specimen brought to him in camp several years ago. The natives report quite a few. G. M. O'Connell reports that he killed one Spruce Grouse near Otter lake.

20. *Bonasa umbellus togata* (Linn.). Canadian Ruffed Grouse.

Common. Many adults and young recorded about camp every year.

21. *Pediocetes phasianellus* (Linn.). Sharp-tailed Grouse.

On July 20, 1913, near Hardwood lake we saw what we took to be a sharp-tailed grouse though never familiar with it before in the field. This rather negative note is introduced because of the reported spread of this form into this region.

22. *Circus hudsonius* (Linn.). Marsh Hawk.

Two recorded August 2, 1913 and two during the summer of 1919. At Point Lumini, Mrs. Haber recorded one August 20, 1911.

23. *Accipiter velox* (Wils.). Sharp-shinned Hawk.

One reported August 26, 1919 at Hardwood lake by Mr. G. Wilson.

24. *Accipiter cooperi* (Bonap.). Cooper's Hawk.

Rare. One was observed July 28, 1913 at the camp.

25. *Buteo borealis* (Gmel.). Red-tailed Hawk.

Mrs. J. M. Haber saw it August 24, 1911 at Fox Point. Three seen in 1913 and one in 1919.

26. *Buteo lineatus* (Gmel.). Red-shouldered Hawk.

One reported by Mr. C. Huber, August, 1919, and another at Hollow lake, August 11, 1913.

27. *Buteo platyperus* (Vieill.). Broad-winged Hawk.

Most common of all the hawks in the region. In 1919 it nested at the camp.

28. *Haliaeetus leucocephalus* (Linn.). Bald Eagle.

One recorded July 7, 1913 at Otter lake. In 1919 one immature recorded at Harvey Jr. lake, August 9 and one adult in Algonquin Park, August 15.

29. *Falco sparverius* (Linn.). Sparrow Hawk.

One was seen August 29, 1919 at Huntsville and another August 12, 1913 at Hollow lake.

30. *Pandion haliaetus carolinensis* (Gmel.). Osprey.

In 1913 one was seen (August 4) over the Peat Bog, Otter lake. In 1919 one was reported over Hollow lake, August 12.

31. *Strix varia* Barton. Barred Owl.

Three were recorded in 1913 and one in 1919. Others heard in each year.

32. *Cryptoglaux acadica* (Gmel.). Saw-whet Owl.

Two heard in July, 1913. One seen on August 8, 1919, near the camp.

33. *Bubo virginianus* (Gmel.). Horned Owl.

In a deserted lumber cabin, the dried skin and skeleton of a horned owl was found (July 14, 1919) filled with porcupine quills.

34. *Coccyzus erythrophthalmus* (Wils.). Black-billed Cuckoo.

Common. Frequently heard at night.

35. *Ceryle alcyon* (Linn.). Belted Kingfisher. Common on all the lakes.

36. *Dryobates villosus* (Linn.). Hairy Woodpecker.

Common.

37. *Dryobates pubescens medianus* (Swains.). Downy Woodpecker.

Much less common than the preceding species. In 1919 apparently more common in August than July.

38. *Picoides arcticus* (Swain.) Arctic Three-toed Woodpecker.

On August 24, 1911, two males were seen at Fox Point (Mrs. J. M. Haber). On August 4, 1913, at camp a female was observed feeding its young and later the species was recorded on August 27. In 1919, (Aug. 16) one was shot on a trip to Algonquin Park. Also recorded by Fuertes, Kilburn, Palmer, O'Connell and others.

39. *Sphyrapicus varius* (Linn.). Yellow-bellied Sapsucker.

Easily the most common woodpecker of the region. Many nests and young recorded.

40. *Phloeotomus pileatus abieticola* (Bangs.) Pileated Woodpecker. "Wood cock."

Not common. On August 24, and 26, 1911, Mrs. J. M. Haber recorded it at Fox Point. On August 25, 1913, we saw a "cock of the woods" at Fletcher lake and another at camp August 31. On August 31, behind the camp we found a sound maple stump with typical holes of the species. In 1919 three were recorded at Hardwood lake. The natives hold this and the Spruce Grouse the two handsomest birds of the region.

41. *Melanerpes erythrocephalus* (Linn.). Red-headed Woodpecker.

Uncommon. One was heard back of camp July 5, 1913 and one seen August 11, 1913 at the same place. In 1919 two more were recorded in same locality. Mr. G. M. O'Connell also reports one from Dorset.

42. *Colaptes aureus luteus* Bangs. Northern Flicker.

Common.

43. *Antrostomus vociferus* (Wils.). Whip-poor-will.

A few recorded each season. The natives say they are very common in the spring.

44. *Chordeiles virginianus* (Gmel.) Nighthawk. Common summer resident. Seen every evening on the wing. Nest with two eggs found in a potato patch near the camp July 2, 1919.

45. *Chaetura pelagica* (Linn.). Chimney Swift. Very common summer resident. Nest with four young found in an old barn at Hollow lake, July 26, 1919.

46. *Archilochus colubris* (Linn.). Ruby-throated Hummingbird.

Common in all parts of the woods. They are

very partial to sapsucker borings and quarrel with this species for possession of such trees.

47. *Tyrannus tyrannus* (Linn.). Kingbird.

Common summer resident.

48. *Myiarchus crinitus* (Linn.). Crested Flycatcher.

Quite common summer resident.

49. *Sayornis phoebe* (Lath.). Phoebe.

Quite common summer resident. Nests each year about the camp.

50. *Nuttallornis borealis* (Swains.) Olive-sided Flycatcher.

Common in all the more open woods and in the swamps. Very quiet in August.

51. *Myiochanes virens* (Linn.) Wood Pewee. Common.

52. *Empidonax flaviventris* (Baird). Yellow-bellied Flycatcher.

Recorded in 1919 on two occasions, August 10 at Harvey Jr. lake trail and August 13 back of camp. In 1913 two or three records were made.

53. *Empidonax traillii alnorum* (Brewst.). Alder Flycatcher.

On July 28, 1919, M. C. Huber found a nest with four young in the crotch of a young tree. Later the junior author saw the young and one parent in the thickets.

54. *Empidonax minimus* (W. M. and S. F. Baird.) Least Flycatcher.

Common summer resident.

55. *Cyanocitta cristata* (Linn.) Blue Jay.

Very common. Large flocks were seen assembling for migration after the middle of August.

56. *Perisoreus canadensis* (Linn.). Canada Jay. "Meat Hawk."

Reported more common in fall and winter. Recorded by L. A. Fuertes. Several seen by Carl Huber in Algonquin Park, August 12-16, 1919.

57. *Corvus corax principalis* Ridgw. Raven.

Rare in summer. More in winter. In the more densely wooded portions. In times past they were abundant. Some of the natives attribute its reduction in numbers in this region to their being killed off by poisoned-bait set for foxes, etc. One recorded at Otter lake, August 31, 1913.

58. *Corvus brachyrhynchos* Brehm. Crow

A few observed at camp and around Dorset in 1919. In 1913 and 1911 a few recorded on Lake of Bays. Considered more common in early spring and very scarce in winter.

59. *Agelaius phoeniceus* (Linn.). Red-winged Blackbird.

Not common. One reported August 7, 1913 at Otter Lake; five females at Peat Bog, August 1, 1919, several at Dorset during summer of 1919 and also in August, 1911 at Point Lumini.

60. *Sturnella magna* (Linn.). Meadowlark.

In 1913 one member of the camp reported a meadowlark near Hardwood lake but the natives say they occur in cultivated fields of the region but not at Dorset. Mr. G. M. O'Connell reports one nest found during his seven years at camp.

61. *Icterus galbula* (Linn.). Baltimore Oriole.

Rare. The only definite record we have is at Huntsville, July 1, 1919, but not at camp or surrounding territory as yet.

62. *Euphagus carolinus* (Mull.). Rusty Grackle.

On August 26, 1919 a flock of ten seen at Dorset. In 1913 three were observed at Otter Lake, August 9.

63. *Quiscalus quiscula aeneus* Ridgw. Bronzed Grackle.

Common summer resident

64. *Carpodacus purpureus* (Gmel.). Purple Finch.

Common summer resident throughout the region. Its song is one of the most startling of the woods and is heard through July and most of August.

65. *Passer domesticus* (Linn.). House Sparrow.

In 1913 several were seen at Dorset where in 1919 they were quite common. One recorded at camp July 4, 1919.

66. *Loxia curvirostra minor* (Brehm.). Am. Crossbill.

Not common resident. Several flocks around Otter lake in August, 1913. Common enough in spring for the residents to note it.

67. *Loxia leucoptera* Gmel. White-winged Crossbill.

One fall (September) a flock were around camp for two or three days. (G. M. O'Connell).

68. *Astragalinus tristis* (Linn.). American Goldfinch.

Common summer resident.

69. *Spinus pinus* (Wils.). Pine Siskin.

Several seen at Camp Otter on August 3 and 7 1913.

70. *Poocetes gramineus* (Gmel.). Vesper Sparrow.

Common in the fields around Dorset and in Lake of Bays region. Nest with three eggs found at Otter Lake, August 3, 1919.

71. *Passerculus sandwichensis savanna* (Wils.). Savannah Sparrow.

Rare. Two heard at Dorset July 6, 1913 and one near Hollow lake, July 28, 1919. Several recorded at Huntsville.

72. *Zonotrichia albicollis* (Gmel.). White throated Sparrow.

Very common species. A nest with four eggs was found July 22, 1913, in a carpet of *Lycopodium undulatum*.

73. *Spizella passerina* (Bech.) Chipping Sparrow.

Common summer resident.

74. *Junco hyemalis* (Linn.). Junco.

Common summer resident. A nest was found August 2, 1919 in a huckleberry and blueberry patch at Rock Point, Otter lake, and young were on the wing July 10, 1913.

75. *Melospiza melodia* (Wils.). Song Sparrow.

Not uncommon summer resident especially in swampy places.

76. *Melospiza georgiana* (Lath.). Swamp Sparrow.

Fairly common around camp, e.g. Gem Lake, the Peat Bog and other marshy places.

77. *Pipilo erythrophthalmus* (Linn.). Towhee.

Reported July 14, 1913, between camp and Dorset. Seen in 1911 near Dorset by G. M. O'Connell.

78. *Zamelodia ludoviciana* (Linn.). Rose-breasted Grosbeak.

Common in all parts of the woods. One of the most striking birds of the region.

79. *Passerina cyanea* (Linn.). Indigo Bunting.

In 1911 it was reported at Point Lumini (Mrs. J. M. Haber). In July, 1913, several were heard and seen about Otter and Hardwood lakes, also at Dorset, and in August, 1919, Mrs. A. T. Kerr reported it.

80. *Piranga erythromelas* Vieill. Scarlet Tanager.

Quite common summer resident. Not as common as the the rose-breasted grosbeak.

81. *Progne subis* (Linn.). Purple Martin.

One recorded July 26, 1931 at Otter lake.

82. *Petrochelidon lunifrons lunifrons* (Say.). Cliff Swallow.

On August 2, 1913, a flock of forty was seen at McEachern landing of Otter lake, others along road to Dorset and also at Dorset. One record for 1919.

83. *Hirundo erythrogaster* Bodd. Barn Swallow.

Nearly as common as the Chimney Swift. Young about to leave nest when camp begins.

84. *Iridoprocne bicolor* (Vieill.). Tree swallow. Not common.

85. *Riparia riparia* (Linn.) Bank Swallow.

Several recorded both in 1913 and in 1919. A colony is said to inhabit a sand-bank on the Dorset-Hollow lake road.

86. *Bombycilla cedrorum* Vieill. Cedar Waxwing.

Common summer resident. Two nests found in 1919: one with five eggs in a balsam fir in front of camp, and hatched August 18; another at Hardwood lake, eggs hatching August 16.

87. *Vireosylva olivacea* (Linn.). Red-eyed Vireo.

The only common vireo of the region. Several nests of eggs or young found during the summer of 1919.

88. *Vireosylva philadelphia* Cass. Philadelphia Vireo.

On June 29 and July 1, 1913, one was seen near the camp.

89. *Vireosylva gilva* (Vieill.). Warbling Vireo. One recorded July 2, 1919, in American elms at Dorset.

90. *Lanivireo flavifrons* (Vieill.). Yellow-throated Vireo.

Two seen at camp, July 28, 1919.

91. *Lanivireo solitarius* (Wils.). Blueheaded Vireo.

One recorded July 28, 1913, at portage between Skin and Porridge lakes.

92. *Mniotilta varia* (Linn.). Black and White Warbler.

Common resident. In August numbers apparently much increased from migrations. Young recorded on wing July 9, 1913.

93. *Vermivora rubricapilla* (Wils.). Nashville Warbler.

Quite common. Several seen in 1913 and also in 1919.

94. *Compothlypis americana usneae* Brewst. Northern Parula Warbler.

In 1913, a beautiful male was singing near our tent on June 29. Later saw another on Hardwood road. In 1919 in August two more records were made.

95. *Dendroica aestiva* (Gmel.). Yellow Warbler.

Uncommon. In 1913 recorded at portage railroad of Lake of Bays, at Dorset and one or two at east end of Otter lake. In 1911, August 20, Mrs. J. M. Haber found a male and female and their previous nest at Point Lumini. In 1919, Mr. G. Wilson saw it the last week in August.

96. *Dendroica caerulescens* (Gmel.). Black-throated Blue Warbler.

One of the most common warblers of the region. This like the ruby-throated humming-bird likes the yellow-bellied sapsucker's borings.

97. *Dendroica coronata* (Linn.). Myrtle Warbler.

Fairly common about camp in 1913 and 1919, also recorded at Point Lumini in 1911.

98. *Dendroica magnolia* (Wils.). Magnolia Warbler.

Quite common summer resident. Young on wing recorded July 14, 1913.

99. *Dendroica pennsylvanica* (Linn.). Chestnut-sided Warbler.

Common. Two nests found July 30, 1913 and July 27, 1919 in small bushes not three feet from the ground.

100. *Dendroica castanea* (Wils.). Bay-breasted Warbler.

Several, apparently migrants, reported from August 26, 1919 onwards.

101. *Dendroica fusca* (Mull.). Blackburnian Warbler.

Not uncommon in the latter part of August when both young and adults are seen. Recorded in 1911, 1913, 1919.

102. *Dendroica virens* (Gmel.). Black-throated Green Warbler.

Common summer resident. In the middle of July, 1913 several families of this species were seen on the wing near camp, on Hardwood road. In 1911, Mrs. Haber found it August 24, at Fox Point. In 1919 it was only once recorded August 7, on Hardwood road.

103. *Seiurus aurocapillus* (Linn.). Ovenbird.

Common summer resident.

104. *Seiurus noveboracensis* (Gmel.). Northern Water-thrush.

Recorded July 7, 1913, at Hardwood lake and later July 20, in an alder near camp. In same place in 1919 a pair recorded most of the summer.

105. *Phorornis philadelphia* (Wils.). Mourning Warbler.

In 1913 quite commonly heard from June 28-July 20. Last record for the season was August 9.

106. *Geothlypis trichas* (Linn.). Maryland Yellow-throat.

Common summer resident in every marshy thicket.

107. *Wilsonia canadensis* (Linn.). Canada Warbler.

A common summer resident.

108. *Setophaga ruticilla* (Linn.). American Redstart.

Common summer resident.

109. *Troglodytes aëdon* (Vieill.). House Wren.

Common on road to Dorset. Recorded at Glenmount, portage railroad of Lake of Bays, at Point Lumini.

110. *Nannus hiemalis* (Vieill.). Winter Wren.

Common resident. No bird song do we more associate with the wild north woods than the fine notes of this songster.

111. *Certhia familiaris americana* (Bonap.). Brown Creeper.

Common summer resident.

112. *Sitta carolinensis* (Lath.). White-breasted Nuthatch.

A few recorded each season. Probably more frequent than our records show.

113. *Sitta canadensis* (Linn.). Red-breasted Nuthatch.

Several seen each season during the summer.

114. *Penthestes atricapillus* (Linn.). Chickadee.

Common summer resident. Most in evidence in August.

115. *Penthestes hudsonicus* (Forst.). Hudsonian Chickadee.

Mr. L. A. Fuertes once recorded it on Little Trout lake, in the summer of 1912.

116. *Regulus satrapa* (Licht.). Golden-crowned Kinglet.

Occasionally recorded in September by those who remain after camp closes (September 1).

117. *Regulus calendula* (Linn.). Ruby-crowned Kinglet.

Recorded several times in first weeks of September.

118. *Hylocichla mustelina* (Gmel.). Wood Thrush.

Several heard or seen each season. Also recorded by Mrs. J. M. Haber in 1911 at Fox Point and Point Lumini.

119. *Hylocichla fuscescens* (Steph.). Wilson's Thrush.

One heard July 11, 1913 on hill to west of road from camp to Dorset. In 1919 on July 22 another record in a deep ravine to left of above road. Also recorded at Huntsville July 1, 1919.

120. *Hylocichla ustulata swainsoni* (Tschudi). Olive-backed Thrush.

Fairly common in 1913 and 1919.

121. *Hylocichla guttata pallasii* (Cab.). Hermit Thrush.

Fairly common summer resident. Not so commonly heard in July. Apparently more common in August. Also recorded August 24, 1911 at Point Lumini and Fox Point (Mrs. J. M. Haber).

124. *Planesticus migratorius* (Linn.). American Robin.

A few around camp. More about Dorset, Glenmount, Point Lumini, Fox Point, Huntsville and more open and populated areas.

122. *Sialia sialis* (Linn.). Bluebird.

Not common. One or two pairs usually recorded nesting near Dorset. Also a few individuals are usually seen in the meadows south of Hardwood lake.

V.—THE MAMMALS.

BY A. H. WRIGHT.

These observations are based mainly on the data secured by the author in 1913 when a few small mammals were trapped in spare moments. Interwoven are the accounts of several trustworthy residents, rangers and guides of the region. In this list are thirty-five species, several less than G. S.

Miller, Jr.¹ found at North Bay, Lake Nipissing, where he systematically trapped for a month. He found a slight eastward extension of western forms to North Bay, e.g. *Putorius longicauda spadix* Bangs, *Tamias quadrivittatus neglectus* J. A. Allen. Other forms like *Napaeozapus insignis* (Woodland Jumping mouse), *Synaptomys fatuus* (Bang's Lemming), *Sorex fumeus* (Smoky Shrew), *Microsorex hoyi* (Hoy's Shrew), *Neosorex albibarbis* (Marsh Shrew) are yet missing from our list but might well be expected with future systematic collecting. Of use to the author were J. H. Fleming's "The Mammals of Toronto, Ontario"² in which are recorded forty-one species and the Manual of Vertebrates by C. W. Nash³ wherein he records fifty-one species. The new records are to be expected in the shrews, bats and mice.

Condylura cristata (Linnaeus). Star-nosed Mole. "Mole."

The residents report "lots of them in damp soil" and these "dark in color." One was taken about August 1, 1913 on Fletcher's lake but not observed by the authors.

Sorex personatus I. Geoffroy. Masked Shrew.

Common. Several were found dead on the road to Dorset by the authors, G. M. O'Connell and others. Trapped them around Peat Bog, under mossy banks with plenty of roots, under mossy-covered stumps near the roads and trails, in a dark underground cellar under bark, under logs among manure and rotting saw-dust between old lumber buildings.

Blarina brevicauda talpoides (Gapper). Mole Shrew.

Common. Like the preceding not uncommon about buildings where cats bring them without eating them. Trapped around the Peat Bog in tamarack and spruce areas under decaying stumps, and under mossy logs; amongst carpets of *Lycopodium* in less moist woods. Also taken along the trails and roads.

Myotis subulatus (Say). Say's Bat.

One specimen (C.U. 6700) of this species was taken in the summer of 1913. Only infrequently they were recorded feeding over the Peat Bog from 8 p.m. onwards.

Myotis lucifugus (LeConte). Little Brown Bat.

Not yet taken at Camp Otter, but must be here because of Mr. Miller's record⁴ which is "a specimen of this bat (caught) on the platform of the

(1) Miller, G. S., Jr. Notes on the Mammals of Ontario. Proc. Bost. Soc. Nat. Hist., 1897, Vol. 28, No. 1, pp. 1-44.

(2) Faull, J. H. The Natural History of the Toronto Region, Ontario, Canada. Toronto, 1913, pp. 206-211.

(3) Nash, C. W. Vertebrates of Ontario, Toronto, 1908., pp. 83-96.

(4) Miller, G. S. loc. cit., p. 39.

railroad station at Gravenhurst on the evening of August 16. Many others were seen."

Ursus americanus Pallas. Bear.

Some report the "Brown nosed Bear" as not very common. Hardly a season passes but some of the camp encounters the work, tracks or signs of bear. One resident since 1873 said he had seen only one, but that there were quite a few bears in the region. Occasionally some of the parties from camp frighten them from blueberry, huckleberry or blackberry patches, but rarely ever see them.

Canis lycaon Schreber. "Timber Wolf," "Gray Wolf."

Every winter a few packs are reported in this region. At least two killed west of road to Dorset in the winter of 1918-1919. In winter of 1911-1912 a pack of seven were seen on Fletcher lake and a few years before a pack reported east of Otter lake where many deer were more or less snow bound.

Vulpes fulva (Desmarest). Red Fox.

Common. During the summer their signs are frequently found. Many killed with poisoned bait. The red phase predominates in this region though silver grays are reported. Quite a few cross foxes are taken. Some residents doubt local reports of black foxes.

Procyon lotor (Linnaeus). Raccoon.

Not common. Mr. Joseph Allen who had resided at Fletcher lake since 1873 said in 1913 that raccoons were not plentiful. Never knew they were there until five or six years ago." Toward Lake of Bays and southward they report quite a few. They are held to eat berries, fish, nuts, etc.

Martes americana (Turton). Marten. Pine Martin.

A few in the Dorset region. Allen McEachern of Otter lake reports (1913) them "very scarce. Never caught but one. Have seen more signs." Some hold them quite plentiful where timber is heaviest. On Fletcher lake there are quite a few.

Martes pennanti (Erleben). Fisher.

There are a few in the Dorset region. Fishers are not plentiful about Otter lake. There are more from Hollow lake to and into Algonquin Park. In Fletcher lake region there are far more martens than fishers, and the latter are hard to secure. Arthur Allen, son of Joseph Allen of Fletcher lake took one fisher in the winter of 1911-1912 and another in winter of 1912-1913.

Mustela cicognanii Bonaparte. Bonaparte's Weasel.

Common. This is included by the author on the report of several residents who describe two weasels one quite small and another as large as a small mink. Both are reported great mousers. Some encourage them about the premise for mousing, and

maintain they do no damage. One resident said he always had at least one family around his barn and every winter they turned white as do the larger ones also.

Mustela noveboracensis (Emmons) New York Weasel.

Fairly common. I have the head of this species. It was brought in by a cat.

Mustela vison Schreber. Mink.

Common at Otter lake. Have been very plentiful from Dorset to the Park but have been hunted so much they are becoming very shy. They will attempt to capture anything. One day, near camp a mink tried to catch a bathing cedar waxwing.

Mephitis mephitis (Schreber). Skunk.

Common. One or two have been taken at camp.

Lutra canadensis (Schreber). Otter.

There are quite a few throughout this region. In the winter of 1908-1909 two were taken at Otter lake, one 42 inches and another 47 inches in length. Rarely they are seen in winter at the outlet of Otter lake.

Lynx canadensis Kerr. Lynx. "Bobcat." "Lynk."

"There are a few lynx here, these very shy and more of them toward Timagimi country." Another resident speaks of them as "not extra common" and says that "some are caught every year."

Lynx ruffus (Güldenstaedt). "Wild Cat." Bay Lynx.

These are "very scarce, odd." Another reports that he "has seen only one in several years." A wild cat was reported to have been taken in the winter of 1910-1911 at Hollow lake. As yet I can find no certain evidence that both species are present or that the residents really know the two species apart.

Peromyscus maniculatus gracilis (LeConte). Canadian White-footed Mouse.

Common. This is the common mouse of the lumber camps, houses, barns, etc. Trapped most of our specimens under logs. It is generally distributed through the woods.

Evotomys gapperi (Vigers). Red-backed Mouse.

Abundant. Trapped them under and between mossy logs, stumps, in holes at bases of live trees, amongst Lycopodium carpets and occasionally in old abandoned lumber camp buildings. Were particularly plentiful among hemlocks, arbor vitae, and other conifers, yellow birches, etc.

Microtus pennsylvanicus (Ord.). Meadow Mouse. Meadow Vole.

Presumably common in the open fields but very few were taken at Otter lake. Usually found them in the fields around old lumber camps, beneath boards and logs.

Ondatra zibethica (Linnaeus). Muskrat.

The residents hold them plentiful but in mid-summer they are not so frequently seen. Each summer a few are observed at Otter lake.

Epimys norvegicus (Erxleben). House Rat.

They are reported to be present in the lower country at Bracebridge. All residents agree they have not seen them about Otter lake or northward and in the years of camp none have been taken around it.

Mus musculus Linnaeus. House Mouse.

We have no records of it at camp nor in its vicinity. Some residents in the Fletcher lake region did not know of them. A few people about Dorset assert they occasionally occur there.

Zapus hudsonius (Zinnersmann). "Kangaroo Mouse."

The jumping mouse is not often taken about the camp. On June 30, 1913, we captured two alive in large pits. Most of the residents either do not know them or hold them not very plentiful. Just as in more cultivated regions some of the residents note their particular abundance in hayfields at cutting time.

Erethizon dorsatum (Linnaeus). Porcupine.

Very common. According to some a great nuisance in lumber camps and rangers cabins. They gnaw the tables, leather seats, chairs, wagon seats, belting, etc., yet we believe them persecuted unduly and would hate to see them lost to the north woods.

Marmota monax canadensis (Erxleben). Wood chuck.

Common everywhere. Some of the fire rangers eat the half grown ground hogs. They were about the camp where one semi-tame one near our tent was fed raspberries, bread, and leaves of the bass-wood, wintergreen, sorrel, and raspberries.

Tamias striatus lysteri Richardson. Chipmunk.

Common about camp, along road to Dorset, in lumber camps, on rocky cliffs, about sphagnum bogs, and in almost any habitat not aquatic.

Sciurus hudsonicus (Erxleben). Red Squirrel.

Common. A great nuisance around lumber camp supplies. One ranger tried to frighten them away with a stuffed porcupine, but it didn't work. Occasionally a wild red squirrel will leap for a person. On road to Dorset one of the authors heard a chase in the thicket beside the road and was surprised to have a red squirrel run for him and leap at his knee. This form is held by all the residents as responsible for the scarcity of black squirrels.

Sciurus carolinensis leucotis (Gapper). Black Squirrel.

Scarce. Once more common in this region around Lake of Bays and southward. Some report it too cold for them while others maintain the species has lost its hold in its struggles with the red squirrels. None of the residents have seen the gray phase. The last black squirrel taken near Otter lake was in October, 1909.

Sciuropterus sabrinus (Shaw). Northern Flying Squirrel.

Reported not uncommon in old stubs. We did not see any alive or skins. On September, 1913, I found the tail of one near a residence and on inquiry the owner said the cats frequently catch them and leave only the tails around the house. The tail vertebrae of the tail I picked up measured 24 mm. or in accord with the measurement for *S. s. macrotis*.

Castor canadensis (Kuhl.). Beaver.

Quite common. The tracks, dams, signs and work of beavers are not infrequent in the outlet of Otter lake, along Ten Mile creek, at Hardwood lake, and throughout the region. One of the most interesting experiences of the camp is to spend a night beside a dam of a beaver colony.

Lepus americanus virginianus (Harlan). Southern Varying Hare.

Very common throughout this region. About the beginning of camp (July 1) the young half grown hares are common about the camp quarters. In one garbage hole 4 feet deep we caught them early in the season (July 2, 1913). Others smaller were caught occasionally by hand. When the last of the councillors leave camp September 15 or earlier these hares have no perceptible change in pelage. Later in late October and early November they get the new white coat. There are no cotton-tails at Dorset, Otter lake or northward.

Odocoileus americanus (Erxleben). Virginia Deer.

Common.

Alces americanus Jardine. Moose.

Not common. The first year Professor C. V. P. Young began his camp he saw one and every year some one of the camp reports tracks or signs of moose. A resident of Fletcher lake for 40 years said he had shot three or four during that period and that there were a few stray moose in the region. Another reports "odd Moose here and there between the head of Hollow lake and Algonquin Park. All agree there are no caribou (*Rangifer caribou*.)

FURTHER NOTES ON THE ORCHIDS OF HATLEY, STANSTEAD
COUNTY, QUEBEC, 1920.

BY H. MOUSLEY.

Writing to me last year a correspondent spoke of having had an "orgy" of orchids, and I think the same remark might apply equally well to my experience here at Hatley during the present season, as not content with observing some thirty species or rather more in their native haunts, I have grown most of them successfully indoors, thereby enabling me to more thoroughly examine their wonderful contrivancies for the perpetuation of their species by means of cross fertilization. In passing it may be remembered that it took the scientific world just over one hundred and seventy-five years before this interesting problem of cross fertilization was fully understood or known. It was Nehemias Grew who first announced to the world in 1682 that it was necessary for the pollen of a flower to reach the stigma in order to insure the fruit. After this announcement came a period of over fifty years of discussion and scepticism amongst the leading lights of the botanical world, until Linnaeus in 1735 reaffirmed the fact and proved beyond further doubt that Grew was right. But this was only part of the secret, and it took another fifty years or more, or until 1787, before Christian Conrad Sprengel a German botanist and school-master essayed to explain how certain plants whose particular construction prevented their pollen from reaching the stigma in the usual way were fertilized. He announced the startling fact that they were fertilized by means of insects, but here again like his predecessors he had seen but half the secret, and it remained for Charles Darwin in 1857-58 to read the riddle aright.

Sprengel started out to prove that insects fertilized a flower by brushing the pollen from the anthers by various hairy parts of their bodies, and in their motions conveyed it to the stigma. Difficulties, however, soon confronted him, in the shape of certain plants whose pollen and stigma matured at different periods, and therefore could not be fertilized in the manner he had declared, and thus unknowingly, within an ace of the goal, his theory broke down, and it took a further period of seventy years of controversy and investigation, before Darwin was able to show, that cross fertilization by insects, and not insect fertilization alone, was the fundamental plan involved in floral construction.

To return, however, it will no doubt be remembered that it has always been my ambition to place Hatley in the very first rank as an ornithological, entomological and botanical El Dorado, and I now think in so far as regards the latter, there is no place

in Eastern North America, with the exception of one, that can show such a list of the family Orchidaceae as Hatley. In my last paper on the subject "The Canadian Field-Naturalist," Vol. XXXIV, 1920, No. 3, pp. 44-47, I pointed out that so far as I was aware my only rival was Fairlee in the State of Vermont, with a list of thirty-three species and varieties, against mine of thirty, thus leaving me three behind, which I was determined to try and make up this year by covering further new ground. In this I have been successful, Hatley thus tying with Fairlee for first honours, i.e. unless Dr. Denslow has discovered any fresh species also. My additions are the Small Round-leaved Orchis, *Orchis rotundifolia*, Hooker's Orchid, *Habenaria Hookeri*, and the Rose Pogonia, *Pogonia ophioglossoides*, the adding of the first and last named, however, necessitating my going outside the four square miles radius, both of them having been found at a distance of fifteen miles from my house. As an offset against this I have discovered many new stations for most of the other species, all of which I think with the possible exception of *Calypso bulbosa* could now be found within a radius of three square miles. Even as recently as September 9 I found two new stations for *Habenaria macrophylla* within fifteen minutes walk of my house. Three of the plants had flowered and were in fruit, their respective heights being 59, 52 and 50 cm., whilst their withered spurs with bends even then measured 3.5 cm. in length and over, with leaves from 17.20 to 19.75 cm. in width. Thoreau in his "The Maine Woods," p. 297, speaks of a large plant he specially measured on July 27, 1857, as being 61 cm. in height, with leaves 24.25 cm. long and 22.80 cm. wide, which by its size was possibly referable to this species and not *orbiculata*. As already indicated it has indeed been an exceptionally interesting season, for not only have the three new species mentioned been added to the list given in my last paper, but much further valuable information has been gained with regard to the distribution of most of the other species. The lovely little *Calypso* (of which I was fortunate in finding one plant with white petals and sepals, and another with cream coloured ditto) as usual was the first to appear, being in full bloom on May 25, followed quickly by the Smaller Yellow Lady's Slipper, *Cypripedium parviflorum*, on May 30, and the Showy Orchis, *Orchis spectabilis*, on June 3. The last named has never been an abundant species, and only two or

three plants have ever been found together, although scattered over a wide area, but this year a new station was discovered on the eastern shore of Lake Massawippi, where clusters of from ten to twenty plants were found in full bloom, thus making a most charming picture. The other much rarer member of this family the Small Round-leaved Orchis, *Orchis rotundifolia*, and one of the three new species discovered this season will be dealt with hereafter in an annotated list as before. The opinion expressed in my first paper "The Ottawa Naturalist," Vol. XXXII, 1919, No. 8, p. 145, regarding the Large Yellow Lady's Slipper, *C. parviflorum* var. *pubescens*, has not matured, and I can now safely say that over the ground I have ranged, it is by far the rarest of the two Yellow Lady's Slippers. Two new stations were discovered for the Showy Lady's Slipper, *C. hirsutum*, and on its old ground it was just as abundant as last year, but only one plant was seen having three blooms. Perhaps one of the pleasantest thrills experienced, was the finding on June 26 of a new station near Barnston for the Pink Lady's Slipper or Mocassin Flower, *C. acaule*, where the species was in great profusion, and amongst the lovely pink blooms were innumerable snowy white ones forming a delicious contrast.

Of the *Habenarias* one new station was found for the Northern White Orchis, *H. dilatata*, where the plants were exceptionally fine, but no examples of the var. *media* were met with, although a special search was made for them. Three plants only of the Large Round-leaved Orchis, *Habenaria orbiculata*, were found in bloom, the height of these respectively being 38, 33, and 25.50 cm., much below those of *macrophylla* already given, whilst the length of the spurs did not exceed 2.50 cm. Of the two species *orbiculata* seems to be the rarer, although only five plants of *macrophylla* were actually found in bloom, still the number of flowerless ones of the latter, greatly exceeded those of the former. *H. Hookeri* one of the new species will be dealt with hereafter in the same manner as *O. rotundifolia*. The most interesting member of the family, however, was x *H. Andrewsii*, which was discovered here last year, and of which I have had the good fortune to find several more examples this season, but these it is hoped to make the subject of a separate paper later on. The ground on which I found my Large Purple Fringed Orchis, *Habenaria fimbriata*, last year, has since been trampled out of all recognition by a herd of young stock, and not a single plant could be found, but I located a few elsewhere. With regard to this species and *H. psycodes* much uncertainty appears to exist regarding the precise point where the one leaves off, and the other begins. In this connection I have seen plants with lips 1.8 c.m. in width, whose height and size of leaves,

however, would hardly come up to some people's idea of *fimbriata*. The Grass Pink, *Calopogon pulchellus*, of which only four examples were found last year, was I am glad to say much more in evidence this season, the little station producing twenty-two plants which were still in bloom when I visited it on August 1. I had previously, however, on July 10, found a much larger station for it near Beebe, some fifteen miles away. It was at this station that I also came across the Rose Pogonia, *Pogonia ophioglossoides*, growing in company with *Calopogon*, but as this forms one of the three new species, it will be dealt with hereafter in the same manner as the others. In the Magdalen Islands *Calopogon* grows as thickly as grass so Bro. Marie Victorin tells me, but only attains a height of five inches!, an instance no doubt of habitat and environment similar to that of *Spiranthes Romanzoffiana* to be mentioned later on.

Arethusa or the Indian Pink, *Arethusa bulbosa*, may be said to have been one of the surprises of the season, two new stations having been found for it, in one of which it was in the utmost profusion, one almost white bloom appearing very conspicuous amongst the rest.

The Wide-leaved Ladies' Tresses, *Spiranthes lucida*, still holds its own as the rarest member of this family in these parts, in fact it is the rarest orchid here, only the one specimen mentioned in my first paper having so far been found, and out of the 33 species enumerated it is the only one I have failed to find again this season. In point of numbers the Slender Ladies' Tresses, *S. gracilis*, ran it very fine last season, for only three plants of that species could be found but this year I am glad to say some half-dozen more were located on the same ground. As illustrating the difference that environment can make in the growth of a species, a colony of the Hooded Ladies' Tresses, *Spiranthes Romanzoffiana*, growing on very dry ground could only attain an average height of 8 cm., as against 29 cm., the average of that of another colony growing on very wet ground. Of the Rattlesnake Plantains it is just possible that four plants I came across in fruit on September 3 may eventually turn out to be Menzies Rattlesnake Plantain, *Epipactis decipiens*. Certainly their spikes seemed more one-sided and denser than is usual with *tesselata*, and the locality was a new one, but outward appearances are often deceptive, and I think for this reason it will be best to leave the matter in abeyance for the present, and wait until next year, when it is hoped the plants may still be in existence, and will flower again. The Lesser Rattlesnake Plantain, *E. repens* var. *ophioides*, and *E. tessellata* were scarcer I thought than usual. In "Rhodora," Vol. XIX, 1917, p. 38, there is a short note by Mr. H.

W. Child, entitled "Some Traits of *Epipactis* in Vermont," in which the author draws attention to the fact, that in Vermont when examined in living specimens, the sepals both lateral and dorsal of *E. pubescens* as it comes into flower, are definitely tinged in the centre with a green colour, those of *E. tessellata* with a rose colour, whilst those of *E. repens* var. *ophioides* are pure white. As regards the two last named I can fully bear out Mr. Child's findings in Vermont, for the same thing occurs here at Hatley, and in the case of *tessellata*, so much so, that many of the racemes might be described as rose pink. Those of *repens* var. *ophioides* on the other hand I have never found to be anything but pure white. Of the Coral Roots the Early one, *Corallorrhiza trifida*, was everywhere, but the Large one, *C. maculata*, is far more restricted. The only station I discovered for it last year produced very few examples this season owing to the ground being covered with spruce trees which had been cut down for pulpwood, and although another station was found near my house, it contained only two plants, and none could be found on the ground at the roadside to the northeast of the village shown to me late in August of last year. Although the Green Adder's Mouth, *Microstylis unifolia*, has been described to me as a weed in New Brunswick, I can hardly say the same of it at Hatley, nevertheless my experience this year warrants the statement that it is a very generally distributed plant growing almost everywhere, but usually only in comparatively small numbers. Its cousin the White Adder's Mouth, *M. monophyllos*, still holds its own as a rarity, for although two more stations have been located, making a total in all of four, three of them can only boast of holding some two or three plants each, whilst on the remaining or fourth one, it would probably be hard to find more than a dozen or so. Loesel's Twayblade, *Liparis Loeselii*, I find is quite generally distributed, especially wherever wet places occur on the sides, or at the foot of hills, and here several new stations for it have been found.

And now I must say a few words regarding the great Brulé Bog, near Waterville, of which mention was made in my last paper, and to which a trip in company with my friend, Mr. Ludlow Griscom was contemplated this season. This trip eventually came off on June 23, with results anything but what we had expected. No new orchids were discovered, and had it not been for some interesting species of *Carex*, the trip might almost be said to have been a blank. The cause of this disappointment seems entirely due to a fact we had overlooked in the fall of last year, i.e. the digging of some deep drains, which are no doubt sapping the life out of this bog, in fact it can no longer be considered a bog in the true sense, for on the day we visited it, the fact of gett-

ing one's boots thoroughly wet seemed somewhat remote. All one did was to walk on a springy bed of dry sphagnum and low shrubs, which was tiring in the extreme. In the woods surrounding the bog, however, damper conditions prevailed, and here the following orchids were found during our two visits, viz.: *Cypripedium acaule*, *Habenaria hyperborea*, *H. obtusata*, *Spiranthes Romanzoffiana*, *Epipactis repens* var. *ophioides*, *Listera cordata* and *Corallorrhiza trifida*.

Fortunately for our dejected spirits, I had heard of another famous bog and swamp situated near Beebe, a village some fifteen miles to the southwest of Hatley as the crow flies, and thither we resolved to go on the following day, as I already possessed a pressed specimen of the Rose Pogonia, *Pogonia ophioglossoides*, which had come from there, and this alone was an inducement to me to visit the place, as the species was new to my list. Rising early the next morning (June 24), we made a start by car in anything but propitious weather. However, this gradually improved, and shortly after passing Burrough's Falls, we were cheered by the sight of a Bartramian Sandpiper, *Bartramia longicauda*, standing prominently on a large stone in the centre of a field adjoining the road. This bird I had not seen for seven years and I remarked to my friend that it must be a good omen, and so it proved to be as will be seen hereafter. Fortunately I was acquainted with the owner of the land on which the swamp was situated, and after calling on him and obtaining all particulars as to its exact location, we were able to enter it at the most convenient place, and without loss of time. Almost at once it became evident that this time we had indeed struck a veritable El Dorado, and neither of us I think are likely to soon forget that pleasant damp swamp, with the treacherous little bog at the end of it. The ground was covered with a growth of cedar, spruce and tamarack, with nice open spaces scattered about and everywhere was the wet cool sphagnum moss, amongst which no less than ten different orchids were found at this date, and later in July another was added to the list. Now as already stated the primary object of the visit was to take *Pogonia ophioglossoides* but this could nowhere be found, and I came to the conclusion that we were too early for it which seemed to be borne out when later in the day two solitary plants of *Calopogon pulchellus* were found in bud only, this species usually appearing about the same time and in the company of *Pogonia*. Now late in the afternoon we had wandered down to the small bog at the southwest end of the swamp, and it was whilst returning from there that we decided to work another piece of ground hitherto unexplored before finally leaving for home. Hardly had we commenced a systematic

search, before Mr. Griscom who was slightly in advance, quite casually called my attention, by saying, look at this small orchid. Now this seeming sang froid on the part of my friend, was nothing more or less than a well-feigned piece of acting, for there before me was a specimen of that little gem the Small Round-leaved Orchid, *Orchis rotundifolia*, which neither of us had seen before in nature, and the sight of which had elated him quite as much as it did me. Of course the usual congratulations ensued, and as the Bartramian Sandpiper had been the beginning, so this rare little orchid was the ending of a perfect day. Of the other species found the following is a list, viz.: *Cypripedium parviflorum*, *C. hirsutum*, *C. acaule*, *Habenaria hyperborea*, *H. obtusata*, *Calopogon pulchellus*, *Arethusa bulbosa*, *Listera cordata*, *Corallorrhiza trifida*, and later on in July *Pogonia ophioglossoides*. Although many of them were nearly over or on the wane at Hatley at this date, here in this delightful cool swamp lying at an elevation of about 700 feet or rather more above sea level, they were in the pink of condition. The first named as well as *Arethusa* were in the utmost profusion the perfume from them being delicious, and it is unlikely we shall ever see the sight equalled again, unless it is in this same swamp. The Showy Lady's Slipper, *C. hirsutum*, was not out at this date, but I have been told that it used to be very plentiful at one time, but vandalism of the worst kind has much depleted its ranks. However, it still seemed to be in fair numbers on July 10, the date of my second visit. Other flowers that could hardly escape attention, as they were all over the place, were, Buckbean, *Menyanthes trifoliata*, and False Solomon's Seal, *Smilacina stellata*, and that curious little insectivorous plant the Round-leaved Sundew, *Drosera rotundifolia*, was found in a few places whilst gathering specimens of *Carex tenuiflora*, a somewhat uncommon sedge. What this swamp with the higher woods immediately surrounding it will eventually produce none can say. The latter we were entirely unable to explore, and work has yet to be done during May, early June, late July, August and September, before any adequate opinion can be formed. Under the cedars where I found *Listera cordata* seemed a likely enough place for *Calypso bulbosa*, and who knows but what *Cypripedium arietinum* might not be there also. The higher woods should produce some more of the *Habenarias*, perhaps *Hookeri* and *orbiculata*, but there, further speculation must not be indulged in, time alone will show. The birds were not entirely forgotten, the Northern Parula Warbler, *Compothlypis americana usnea*, and the Golden-crowned Kinglet, *Regulus satrapa satrapa*, being noted, both of which were evidently breeding, as well as the Brown Creeper, *Certhia*

familiaris americana, and the Olive-sided Flycatcher, *Nuttallornis borealis*.

Amongst all this galaxy of beauty and profusion, a vein of regret was struck, when I came to realize that my conquests were fast drawing to a close, and that ere long it would be well nigh impossible to add another new species to my list. Certainly there is still a possibility of finding any of the following, viz.: *Cypripedium arietinum*, *Habenaria dilatata* var. *media*, *H. clavellata*, *H. blephariglotis*, *H. lacera*, *Serapias helleborine*, *Epipactis decipiens* and *Listera auriculata*, a total of eight only, but out of these *C. arietinum* and *Serapias helleborine* are very rare indeed, and are hardly likely to fall to my lot. Still there is plenty of ground to cover yet, and one never knows what a turn in the road may mean, perhaps some overlooked little wood, swamp, or bog, where hidden away lies some rarity, and herein lies the charm of orchid hunting.

In conclusion the following is an annotated list of the three new species found this season, viz:

Small Round-leaved Orchid, *Orchis rotundifolia*, Banks. This rare little orchid which was once aptly described to me by a lady friend as a beautiful little spike of tiny opalled flowers, was first discovered on June 24 near Beebe, a village lying to the south east of Hatley, and distant about fifteen miles as the crow flies. The colony was a very small one, consisting of some half dozen plants only, but when visited again on July 10, three or four more (one in perfect bloom even at this late date) were found in the immediate neighbourhood of the others. With more time at one's disposal to enable a thorough systematic search to be made (the area of the swamp being considerable) it is hoped to find it in greater abundance another year. The location was an old and somewhat grown up logging road, in the centre of which, and at the sides, the plants were growing.

Hooker's Orchid, *Habenaria Hookeri* Torr. The home of this orchid lies on the eastern shore of Lake Massawippi, between the railway station of that name, and Perkin's Point. There I found several small colonies of it in bloom from as early as May 30 to as late as June 25, when it was beginning to get over. It is a fallacy to suppose (as many of the books would have us believe) that the leaves of this orchid in contra distinction to those of *H. orbiculata* are always raised above the ground, and for this reason the plants when not in flower can be distinguished from the latter. There is really no absolute means of distinguishing *Hookeri*, *orbiculata*, or *macrophylla* from one another when in leaf only, as I have found all three of them at one time or another, with leaves raised above, and also lying flat on the ground. Even when the scape is partly developed one may be deceived, but *Hookeri* is

usually ebracteate, and so can be distinguished with tolerable certainty from the other two, on whose scapes there are always bracts.

Rose Pogonia, *Pogonia ophioglossoides* (L.) Ker. This delicately coloured orchid although known to have been found in the large swamp near Beebe as already mentioned, was not in bloom when we visited it on June 24, but I was fortunate to secure it on my second visit on July 10, although even then it could hardly be said to be fully out, although its

companion *Calopogon pulchellus* apparently was. Both these species were found principally on the outskirts of the little bog at the far end of the swamp where the Small Cranberry, *Vaccinium Oxyccocos*, grew in profusion. Of *Pogonia*, only about a dozen or more plants were in bloom, whilst of *Calopogon*, there were probably about three times as many, so the station apparently is not a large one for either species.

FURTHER NOTES ON THE RHOPALOCERA OR BUTTERFLIES OF HATLEY, STANSTEAD COUNTY, QUEBEC, 1920.

By H. MOUSLEY.

After a storm there usually comes a calm, and so after a year of plenty there usually follows one of scarcity, at least I have generally found it so with the butterflies, and this year has certainly proved no exception to the rule.

Reverting for a moment to my previous paper in "THE CANADIAN FIELD-NATURALIST," Vol. XXXIV, 1920, No. 1, pp. 7-10, it will be found that the species there recorded for Hatley numbered forty-five. To this total can now be added another three, the Mountain Silver-spot (*Argynnis atlantis*), the Brown Elfin (*Incisalia augustus*), and the Coral Hairstreak (*Strymon titus*) which latter I find has been taken by Mr. George A. Moore at North Hatley. See "A Preliminary List of the Insects of the Province of Quebec," A. F. Winn, 1912, p. 15.

At first sight this result may appear a very poor one, but in reality it is about as much as can now be expected in any one season, the time having arrived (the same as with the orchids) when it is going to be a matter of much difficulty to add to one's laurels, the final goal having been about reached in both cases. As regards the Mountain Silver-spot it could without doubt have been added to my list long ago had not other interests taken up all my time, and prevented me from paying more attention to the genus *Argynnis*, a difficult one, and of which *atlantis* is a member. It occurred in some numbers near Mount Orford about eighteen miles to the northwest of Hatley during the present season (1920) so Mr. Winn tells me, and to whom I am indebted for specimens, which enabled me to see that a few examples I had placed on one side as doubtful *aphrodite* were in reality *atlantis*. The little Brown Elfin I first came across on June 8, when visiting the great Brulé Bog near Waterville, some thousand acres in extent, and judging from its worn condition on that

date, it must have been on the wing for about a fortnight. The next time it was met with was on June 20, when visiting another small bog (for the first time) two miles to the north of the village, and then again four days later it was found in a large swamp near Beebe, a village some fifteen miles to the southwest of Hatley, so that this little Hairstreak seems fairly well distributed wherever bogs are in evidence, its larvae feeding on sheep laurel and blueberry, which are usually found in such places. In the first named locality it was in great profusion principally on the edges of the woods bordering the bog, but in the other two it was not nearly so plentiful, probably owing to the much later date and its being nearly over.

Returning to the subject of the general scarcity of butterflies, the only species that could compare in point of numbers with former years were the two large Fritillaries, *Argynnis cybele* and *A. aphrodite*, and these literally swarmed again, in fact, I have never known a season in which they did not. Several of the small skippers were in goodly numbers as well as the Spring Azure, more examples of the form *lucia* being seen than previously. The Arctic skipper, *Carterocephalus palaemon*, was located again in small numbers, not only at Hatley, but also in the large swamp near Beebe already referred to. The Black Swallow-tail, *Papilio polyxenes*, regained its normal position, but the Monarch, *Danaus archippus*, again failed to put in an appearance, although ten examples of its counterpart the Viceroy, *Basilarchia archippus*, were seen at various times between June 12 and August 28, quite an unprecedented number. The little Wanderer, *Feniseca tarquinius*, kept up its apparent record for rareness, only one example being seen on June 14. Of the genus *Pogonia* which was so plentiful last year, very few ex

amples were seen, in fact, not one of the handsomest the Violet Tip, *Polygonia interrogationis*, and of the Green Comma, *P. faunus*, recorded by Gosse in 1835-38 it still remains unchecked, although I see it has been taken at East Bolton eighteen miles to the west of Hatley see ("A Preliminary List of the Insects of the Province of Quebec," A. F. Winn, 1912, p. 13.)

Of the smaller Fritillaries, *Nycteis* was better represented and seems more generally distributed than I had hitherto imagined. Harris' Checkerspot, *Melitaea harrisi*, on the other hand appears to have entirely died out from the one meadow where I used to find it, as repeated visits again this season failed to reveal its presence. The Pearly Eye, *Enodia portlandia*, as in the days of Gosse kept up its reputation for rareness, as I only saw four examples of it during the month of July. The two Hair-streaks, the Acadian, *Strymon acadica*, and Striped, *Strymon liparops*, were found in their usual

haunts on the roadside, but since then all the shrubs have been cut down and burnt, so that next year may witness a great scarcity, if not total extermination of these two species. Hunter's butterfly, *Vanessa virginiensis*, which during the past two years has been unusually plentiful has not been seen at all during the present season, and the same remark applies almost equally well to the Painted Lady, *Vanessa cardui*, although I did see one fresh example on October 7. Of the American Tortoiseshell, *Aglais milberti*, only a few examples have been noted, although at one time a season never went by without its larvae being found on a bed of nettles near my house, but of late years none have been seen.

In conclusion as last year went down to posterity in these parts at all events as a record entomological one, so will this one equally do so, but not for abundance, and it is a matter of congratulation to think that I had other researches in hand which kept my time fully occupied.

OBITUARY

CHARLES GORDON HEWITT

Science has lost several able men during the last few years and the Ottawa Field-Naturalists' Club has been deprived of more than one leader of international reputation. Such were the two Macouns and Lawrence M. Lambe and now to these is added C. Gordon Hewitt, late Dominion Entomologist and Consulting Zoologist.

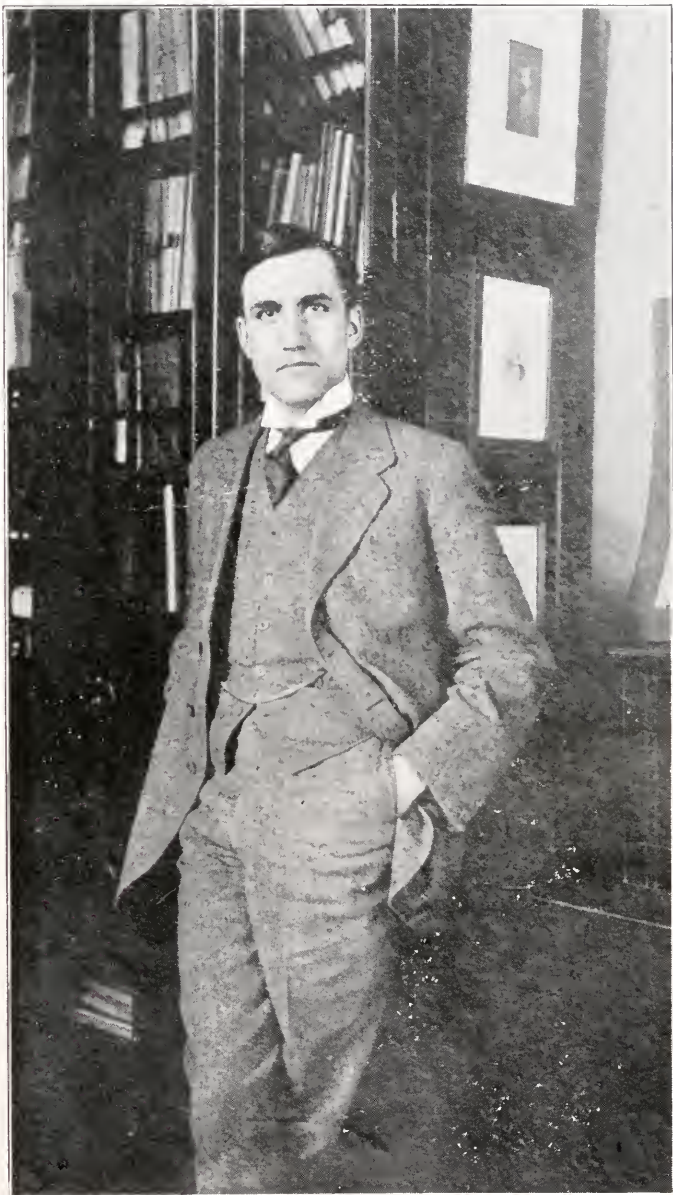
Dr. Hewitt was born and educated in England and before coming to Canada had taught zoology in the University of Manchester. Accepting the position of Dominion Entomologist soon after the death of Dr. James Fletcher, he came to Canada in the fall of 1909 to take over the new work. His task, at that time, was by no means an easy one as his predecessor had set a very high standard and had, moreover, been highly esteemed by all who knew him. To follow successfully in such footsteps required unusual ability which the new chief was soon found to possess. Fletcher had been hampered by holding the dual position of Entomologist and Botanist, through lack of assistants and inadequate quarters. Under the new arrangements the departments were separated and slightly more space became available.

Dr. Hewitt proved to possess marked executive ability with which he combined a diplomacy that awakened friendly envy among his colleagues of other departments. Within a few years the Divi-

sion of Entomology had been developed into a separate branch of the Department of Agriculture with a network of field laboratories extending from the Atlantic to the Pacific. Thus at the time of Dr. Hewitt's death some ten years after he took office, the Entomological Branch contained no less than 63 members, four divisions and maintained twelve field laboratories, with trained officers in charge whose business was to study local insect problems. In addition an efficient quarantine had been inaugurated against the importation of foreign pests. Such is a brief summary of the advancement achieved under Dr. Hewitt's direction.

In addition to Entomology, Dr. Hewitt took a keen interest in kindred sciences, more particularly ornithology, a practical demonstration of which may be recalled in the important Migratory Bird Treaty between the United States and Canada in which Dr. Hewitt, as Consulting Zoologist took a leading part for the Canadian Government. He also entered enthusiastically into the question of establishing bird sanctuaries and did much to create an interest in the erection of bird nesting boxes in the vicinity of Ottawa.

Towards the last he had turned his attention to studying means for the control of predatory mammals and at the time of his death had accumulated a mass of evidence to favor a scheme for suppressing such pests.



Charles H. H. H.

Dr. Hewitt was the recipient of many honors from scientific societies; he was a past president of the American Association of Economic Entomologists, of the Entomological Society of Ontario and the Ottawa Field-Naturalists' Club; a Fellow and Treasurer of the Royal Society of Canada, etc., etc. The gold medal of the Royal Society for the Protection of Birds was presented to Dr. Hewitt in March, 1918, in recognition of his services in furthering the Migratory Bird Treaty between the United States and Canada. He wrote more than a hundred papers on scientific subjects, the best known being his book on the House-fly. A book on Wild Life in Canada is in course of publication at the present time.

Dr. Hewitt was married to Elizabeth Borden, daughter of late Surgeon General Sir Frederick

Borden, of Canning, Nova Scotia, in whom he found a ready helpmate and an inspiration for the work he had so much at heart.

His untimely death, on February 29th, 1920, at the age of 35, closed a career of marked achievement and one of great future promise. The loss to the Entomological Branch is one that only those in close touch with the work can estimate, but the foundation for future progress has been well laid so that those who follow can confidently build upon the structure so ably begun.

NORMAN CRIDDLE.

A more detailed obituary notice prepared by Arthur Gibson and J. M. Swaine, was published in the May, 1920, issue of the Canadian Entomologist, together with a list of the writings of the late Dr. Hewitt, compiled by C. B. Hutchings.

JOHN MACOUN MEMORIAL.

At the request of naturalists generally throughout Canada, the Ottawa Field-Naturalists' Club has decided to receive subscriptions for a permanent memorial in honour of the late Prof. John Macoun, Naturalist of the Geological Survey of Canada, who died at Sidney, B.C., on July 18, 1920.

The wide field of natural history work to which John Macoun devoted his life is well known, not only throughout Canada but in other countries as well. He specialized particularly in botany and was the founder of the Canadian National herbarium. Other sciences, however, specially zoology, were also greatly enriched by him; he will always be remembered as a great pioneer in Canadian natural history.

Many friends of the late John Macoun, particu-

larly in Toronto and Ottawa have thought that the memorial should take the form of a painted portrait to be hung in the Victoria Memorial Museum. Such a memorial has now been decided upon and a painting will be made by Mr. Franklin Brownell of Ottawa, the well-known portrait painter. Expenses in connection therewith will be about \$700.

Subscriptions to this fund should be forwarded to Mr. Arthur Gibson, Dominion Entomologist, Ottawa.

Should the list be oversubscribed arrangements may be made whereby those subscribing above a certain sum, which now cannot be defined, will receive a reproduction of the painting. A list of those who subscribe will be published in the Canadian Field-Naturalist.

A.G.

REVIEWS.

THE AUK FOR 1920, VOL. XXXVII.

During the year 1920 the following titles of interest to Canadian ornithologists, either for authorship or subject matter, have appeared:—

NO. 1. JANUARY.

In Memoriam: William Brewster, born July 5, 1851, died July 11, 1919. By Henry Witherbee Henshaw, 2 plates, pp. 1-23.

William Brewster—An Appreciation. By John George Gehring, pp. 24-28.

Wm. Brewster, the Dean of American ornithology was probably better known personally to the past than to the present generation of Canadian

naturalists. He largely influenced Canadian ornithology through Vennor, Chamberlain, Boardman, McIlwraith, &c., even to the present generation of those fortunate enough to know him. The rest of us know his writings and the affection with which he was generally regarded through which he still lives. Funds for a Brewster Memorial have been raised by subscriptions from both sides of the line. This is to take the form of a gold medal to be awarded semi-annually for outstanding work on birds of the Western Hemisphere. It is in keeping that the medal has been designed by Brewster's life-long friend, Daniel C. French, the sculptor.

The Status of the Subspecific Races of *Branta canadensis*, by J. D. Figgins, pp. 94-102.

This paper was suggested by H. Swarth's monograph on the subject (Cont. from Mus. Vert. Zool. Univ. of Cal.) It is proposed that *huchinsi* and *occidentalis* be dropped as recognized sub-specific races of the Canada Goose and be regarded as hybrids between *canadensis* and *minima*, the latter being raised to full specific status. Remarks on this proposal will be found farther along in these reviews.

The Thirty-seventh Stated Meeting of the American Ornithologists' Union. By T. S. Palmer, pp. 110-125.

This was held Nov. 10-13, 1919, at the American Museum of Natural History, New York. Canada was well represented by three Fellows, one Member and two Associates. 247 Associates were elected, 14 of them from Canada.

In General Notes, p. 145, Jonathan Dwight under the heading, Nomenclatural Casuistry, takes exception to H. C. Oberholser's (Can. Field Nat., XXXIII, pp. 48-50) founding the name of his new race of Red-headed Woodpecker on an acknowledged *lapsus calami*. The use of the specific term *erythroptalmus* instead of *erythrocephalus* in the original citation upon which Mr. Oberholser bases his name is plainly an error missed by the proof-reader. It is absurd to regard it as a serious nomenclatural fact. Such pedantic adherence to the letter of the law of priority should be discouraged.

Under Recent Literature,—

The Birds of Eastern Canada, by P. A. Taverner, is reviewed, pp. 147-149. As much commendation as the work is entitled to is given. Amongst the minor criticisms made by W. S. is but one on which the present writer would like some light. Mr. S. objects to the author's use of the term "type form, race or subspecies" as applied to the first described group of a given species. It would be gratifying to know how better to express the idea. Whilst first described races have no taxonomic superiority over those discovered later they have nomenclatural priority and as such are often to be referred to. It is unfortunate that the word "type" and "typical" have been given restricted and specialized meanings in zoology. The development of scientific concepts has twisted them from their obvious meaning and deprived us of very valuable words in their ordinary sense.

The Status of *Larus hyperboreus barrovianus*, by H. C. Oberholser. Proc. Biol. Soc. Wash., Vol. 32, pp. 173-174, reviewed p. 166.

It may be remembered that this author lately advocated the revival of the Point Barrow Gull as a

recognizable subspecies of the Glaucous Gull and that Dr. Dwight in a paper referred to in the previous volume of this journal advanced strong evidence to the contrary. This paper continues the argument. It resolves itself into the old question of what is a subspecies and upon how fine distinctions it can be founded. The writer has examined a considerable number of these north-western birds and recognizes that they do average smaller, though with so much individual variation and so many exceptions that few birds can be recognized with certainty without a knowledge of their geographical origin. It is a matter of opinion whether such races are worthy of nomenclatural recognition.

Under Notes and News,—

P. 186 is a brief report on the size and scope of the bird collections of the Victoria Memorial Museum, Ottawa.

P. 187 is a note on the progress of the Reports of the Canadian Arctic Expedition, 1913-18. As far as birds are concerned only a part on bird parasites (*Mallophaga*) and a few scattered identifications of invertebrate forms in bird stomachs have appeared, but Dr. R. M. Anderson expects to get the reports on Birds and Mammals out as soon as the pressure of his duties as editor of the whole series permits.

P. 188 informs us that the Museum of Vertebrate Zoology of the University of California has received from Miss Annie Alexander an endowment of \$200,000 for its maintenance. This institution has done in the past, and will do in the future, much valuable work within our borders in the course of its survey of west coast conditions. It is a matter of satisfaction on both sides of the line that the future usefulness of this able institution is assured.

NO. 2. APRIL.

Additions to the Avifauna of the Pribilof Islands, Alaska, including Four Species New to North America, by G. Dallas Hanna, pp. 248-254. Mr. Hanna's residence upon these lonely oceanic islands has given him unusual opportunities for studying their bird life. Close to the dividing line between America and Asia, where the New and the Old Worlds come most nearly into contact, he has collected and observed many Old World stragglers and probably has added more species to our Check List than any other living man. The greatest importance of these technical additions to our avifauna lies in the possibility of their occurrence south along the continental coast and in suggesting species to be looked for there.

The Subspecies of *Branta canadensis* by H. S. Swarth, pp. 268-272. In this paper the perplexing subject of the Canada Goose and its races comes

up again. Mr. Swarth takes exception to Mr. Figin's article, mentioned previously in these reviews, both in treatment and substance. He does not agree to the proposal for regarding *hutchinsi* and *occidentalis* as hybrids between two species, *B. canadensis* and *B. minima*, and, basing his study on fuller breeding data, seems to have the best of the argument. With Mr. Swarth we agree that there is a north-west coast form with well-marked color characteristics. Whether *occidentalis* can be applied to it is not perfectly clear. Unfortunately, as Mr. Swarth states, the type specimen on which that name is founded is one of those puzzling nondescript, perhaps abnormal, birds that are not easy to fit into present recognized divisions. This is a good example of the founding of supposed new races on too few specimens, and the danger of setting up freaks or intermediates as types. In spite of all this discussion the relationships of the various forms of the Canada Goose can hardly be said to be settled, nor is it likely that they will be until we can establish the essential characters of the various geographical breeding groups. We will then have definite standards for the comparison of the heterogeneous flocks that are met with in migration. In the meantime, species and subspecies derived from mixed migrants are as likely to be arbitrary groupings of characters as racial divisions.

Plumages of Gulls in Relation to Age as Illustrated by the Herring Gull (*Larus argentatus*) and Other Species. By Jonathan Dwight, 5 plates, pp. 262-268.

If the geese of the genus *Branta* are in confusion still worse is the state of the gulls of the genus *Larus*. This paper traces out the age sequence of the gulls, taking the Herring Gull as an example, and details the successive plumage characters from birth to maturity, with plates of wing and tail details of each stage. Dr. Dwight concludes that it is not until the fourth winter plumage that all traces of juvenility are lost, making a four year plumage cycle. He closes his paper with lists of all American gulls in two, three and four year plumage cycle groups. This is a most valuable paper, and one that prepares for the foundation of a proper understanding of these puzzling birds.

Fifth Annual List of Proposed Changes in the A.O.U. Check-list of North American Birds. By Harry C. Oberholser, pp. 274-285.

Perhaps it is well for Mr. Oberholser's reputation with the general public to state that these are compilations of suggestions by all authors, and that he is not quite the iconoclast that the title might suggest. The list is a staggering threat against our stable (?) scientific nomenclature. There are about a hundred proposed changes and

twenty rejections and eliminations. We cannot expect that finality can ever be reached in any scientific subject, philological or zoological, but our greatest comfort in inspecting this one year's record of changes is that it is only proposed and not an accepted fact.

Under General Notes,—

Dr. J. C. Phillips, pp. 289-291, describes Habits of the Two Black Ducks, and records differences in the winter distribution and habits of the two much debated subspecies of Black Duck, *rubripes* and *tristis*, that go far to substantiate the validity of the distinction we make between them.

Geo. H. Stuart, p. 292, records the breeding of the Greater Yellow-legs in the vicinity of Grand Lake, Newfoundland, June 20, 1919.

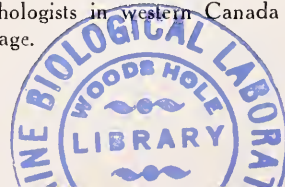
W. E. Saunders, pp. 304-306, gives us Additional Notes on the Birds of Red Deer, Alberta. This constitutes an addenda to the writer's Birds of the Red Deer River, Alta. (*Auk*, 1919). It gives observations on 31 species, and adds seven to the list of that section.

Under Recent Literature is noted a paper On the Protection of Birds in the Province of Quebec, by F. Gaguin, *Revue Française d'Ornithologie*, XII, Dec., 1919.

In Notes and News, p. 346, appears the notice of the death of the late J. M. Macoun, whose obituary appeared in a previous number of this journal.

Pp. 348-352 contain an interesting survey of the location and distribution of complete sets of the *Auk*. As this journal is the most important bird publication in the New World but little work in the field can be accomplished without reference to its files. It is therefore somewhat alarming to note that, so far, only about 150 complete sets have been located in public or private libraries. As those in private hands are steadily being absorbed by institutions where they remain, and there is a constant loss through fire and accident, the question is naturally raised as to what the future student, not situated near any of a certain limited number of institutions, will do for this important literature. It is worth noting both for information and as a warning that but eight complete sets exist in Canada. Two are to be found in each of the following cities, Montreal, Ottawa and Toronto, and one each in London and Quebec. It will be noted that there is not a single complete file west of southern Ontario. Unless this is corrected whilst the opportunity for correction exists it will place future ornithologists in western Canada at a great disadvantage.

P. A. TAVERNER.



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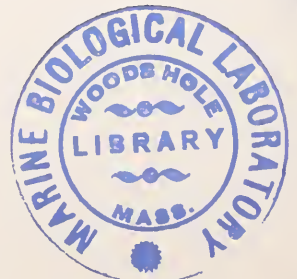
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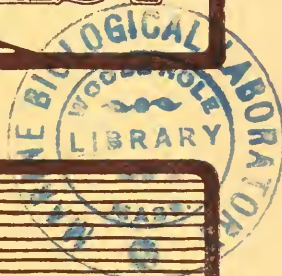
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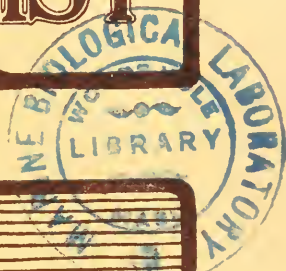
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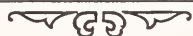
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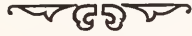
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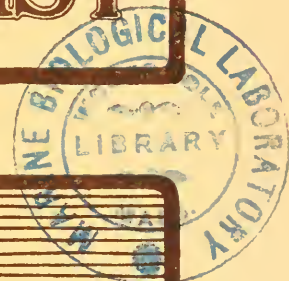
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